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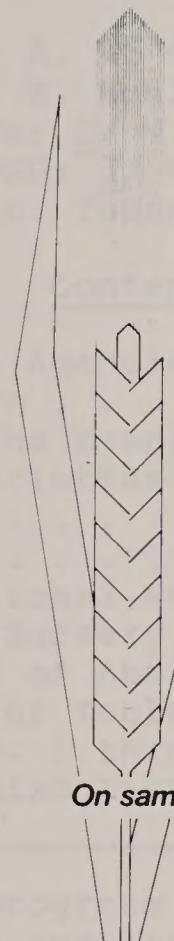
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HARD RED SPRING QUALITY REPORT

Physical, Chemical, Milling, and Baking Characteristics

United States Department of Agriculture
Agricultural Research Service
North Central Region

REPORT OF INTRINSIC, CHEMICAL, PHYSICAL AND BAKING
EXPERIMENTS WITH HARD RED SPRING WHEAT
1984 CROP



HARD RED SPRING QUALITY REPORT

On samples received from the 1984 crop

Source:

Spring and Durum Wheat Quality Laboratory
USDA, Agricultural Research Service
Harris Hall, N.D.S.U.
Fargo, North Dakota 58105

REPORT OF PHYSICAL, CHEMICAL, MILLING AND BAKING
EXPERIMENTS WITH HARD RED SPRING WHEAT

1984 CROP^{1/}

by

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1/ This is a progress report of cooperative investigations containing some results that have not been sufficiently confirmed to justify general release; interpretations may be modified with additional experimentation. Confirmed results will be published through established channels. Cooperators submitting samples for analysis have been given analytical data on their samples prior to release of this report. The report is primarily a tool for use of cooperators and their official staffs and to those persons having direct and special interest in the development of agricultural research programs.

This report was compiled by the Agricultural Research Service, U. S. Department of Agriculture. Special acknowledgment is made to the North Dakota State University for their facilities and services provided in support of these studies. The report is not intended for publication and should not be referred to in literature citations nor quoted in publicity or advertising. Use of the data may be granted for certain purposes upon written request to the agency or agencies involved.

2/ Hard Red Spring & Durum Wheat Quality Lab., NDSU.
3/ Dept. of Cereal Science & Food Technology, NDSU.

1984 COOPERATING AGENCIES AND STATIONS

The cooperative agencies and stations conducting the varietal plot and nursery experiments from which the 1984 spring wheat samples were received are listed below:

Arizona Agricultural Experiment Station:

Mesa, Pinal County

University of California, Davis:

Imperial Valley

Minnesota Agricultural Experiment Station:

Crookston, St. Paul, Morris, north area, south area

Montana Agricultural Experiment Station:

Sidney, Havre, Bozeman

North Dakota Agricultural Experiment Station:

Williston, Fargo, Minot, Dickinson, Langdon
and Carrington Irr.

South Dakota Agricultural Experiment Station:

Brookings, Redfield, Selby, northeast area

Idaho Agricultural Experiment Station:

Aberdeen, Tetonia

Wisconsin Agricultural Experiment Station:

Madison

Wyoming Agricultural Experiment Station:

Sheridan

Washington Agricultural Experiment Station:

Pullman

New York State College of Agric. & Life Sciences-Cornell Univ.

Ithaca, Onondaga

Pioneer Spring Wheat Research Station, Minnesota:

Glyndon

A complete list of all cooperating agencies, stations, and personnel for the year will be found in the report by R. H. Busch, et al., Wheat Varieties Grown in Cooperative Plot and Nursery Experiments in the Spring Wheat Region in 1984.^{4/}

^{4/} Busch, R. H. Wheat Varieties Grown in Cooperative Plot and Nursery Experiments in the Spring Wheat Region in 1984. Agricultural Research Service, U. S. Department of Agriculture and State Agricultural Experiments Station, St. Paul, MN.

INTRODUCTION

Samples of standard varieties and many of the new strains of hard red spring wheat grown in cooperative experiments in the spring wheat region of the United States^{4/} have been milled each year by the USDA. The flours were assayed chemically and physically and baked into bread to determine the quality characteristics. The purpose of this report is to make available to the cooperators and other interested parties, quality data on the standard varieties and new strains of hard red spring wheat from the 1984 crop.

The same general format and techniques were used in evaluating the wheat as outlined in quality reports for previous years. The same computer scoring system has been used for the past three years, hence some faulting values differ slightly from previous years. In general, data contained in this report are comparable to data in past reports and, where applicable, average results and also the average results of other crop years are compared. The area averages are tabulated for the Uniform Regional Nursery varieties of Butte, Era, Chris and Waldron. A five-year average (5-YA) and the averages for the individual five years include all selections grown in the Uniform Regional Nurseries for that year. These results give an overview of individual years and the influence of environment on the crop. The actual crop characteristics may be somewhat different due to differences in varieties, but the change from year to year is applicable.

The evaluation of a sample involves three areas of analysis: kernel characteristics, milling performance and baking evaluation. A brief description of the methods is given on pages 9 to 11 of this report. It is possible to deduce the various characteristics of the selection and any outstanding features or deficiencies which are apparent. No specific comments are made regarding the mixogram patterns, since reference mixograms for each of the general types are presented at the end of the report.

Seeding for the 1984 crop over the spring wheat area started in western North Dakota about April 2; in eastern North Dakota some planting started about April 9. In the northern area some planting started April 16. It started to rain April 19 in eastern North Dakota. Heavy snow in western and northern ND - up to 24 inches fell by April 27. Most of the small grain planting was completed by the end of May.

The average flour extraction was 1.1% higher than the 1983 crop but only 0.2% higher than the 5-year average. Wheat mineral content was much lower than the 1983 crop and also lower than the 5-year average. The wheat protein content was 1.0% lower than the 1983 crop and also 0.6% lower than the 5-year average. The physical characteristics of the wheat were somewhat better than both the 1983 crop and the 5-year average. Bake absorption was 0.8% lower than the 1983 crop and also 1.7% lower than the 5-year average. Mix time was equal to the 1983 crop but slightly shorter than the 5-year average. The loaf volume for the 1984 crop was lower than either the 1983 crop or the 5-year average. Oxidation requirements were the same.

SOURCE OF THE 1984 CROP SAMPLES

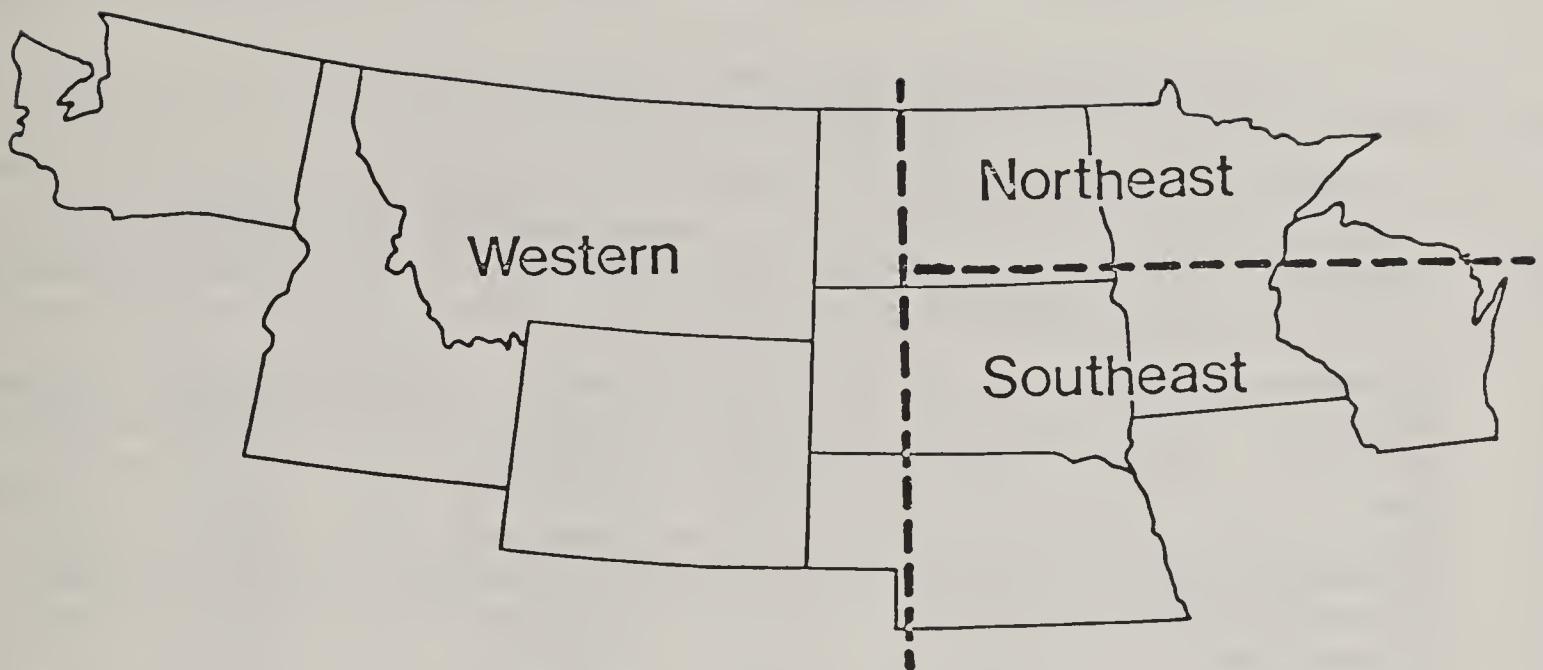
Tests were performed on 1,596 samples. However, data on 891 of these are not included in this report, because this information was of interest to plant breeders at specific experiment stations only. Data presented in this report are from the Field Plot Nursery and the Uniform Regional Nursery. The samples came from 23 stations in 10 states shown below:

Arizona: Mesa and Pinal County
California: Imperial Valley
Idaho: Aberdeen and Tetonia
Minnesota: Crookston, St. Paul and Morris
Montana: Sidney, Havre and Bozeman
North Dakota: Williston, Fargo, Minot, Dickinson,
 Langdon and Carrington Irr.
South Dakota: Brookings, Redfield and Selby
Washington: Pullman
Wisconsin: Madison
Wyoming: Sheridan

On page 8 are listed the spring wheats that were included in the Uniform Regional Nursery trials. The variety or cross, the station that developed the variety, the state selection number and the C.I. number also are given.

BLENDING AND AVERAGING PROCEDURES USED

Individual wheat samples from the Uniform Regional Nursery originating from the three geographical areas shown in the illustration on page 7 were blended according to area. All but one of the 23 stations were compatible for blending. (The results from that station are included as individual data.) Milling performance, mixograms and baking data were obtained from these area blends. However, data for kernel characteristics are arithmetical averages of individual sample analyses. These data from the Uniform Regional Nursery also are compared with averages from the previous four years (Table 7).



Wheat blends were made according to the geographical areas shown above.

Data for the Field Plot Nursery are on the individual samples.

THE UNIFORM REGIONAL HARD RED SPRING WHEAT PERFORMANCE NURSERY

The 34 entries in the 1984 URHRSWPN are listed below:

Entry No.	Cross or Variety	CI No. or Sel. No.	Year Entered	Source
1.	Marquis	3651	1929	Canada
2.	Chris	13751	1969	USDA-MN
3.	Waldron	13958	1964	ND
4.	Era	13986**	1972	USDA-MN
5.	Butte	17681	1979	ND
6.	Eureka/Prodax	SD2861**	1981	SD
7.	Protor/RL 6010/Marshall	SD2919**	1983	SD
8.	Coteau/Dawn	SD8026	1983	SD
9.	Butte/James	SD2925	1983	SD
10.	FB439/MT7149	MT8017**	1982	USDA-MT
11.	ND681/MT6830	MT7926	1983	USDA-MT
12.	PK176/SI/MT7149	MT8043**	1983	USDA-MT
13.	Crim/2*Era//MN6923 's'	MN73167**	1981	USDA-MN
14.	Fch/Nor 66//Kitt/3/MN7125	MN7529**	1982	USDA-MN
15.	Era/Kitt//MN7173/3/MN7357	MN81070**	1983	USDA-MN
16.	MN7262/Era//MN7083/Polk 's'	MN81101**	1983	USDA-MN
17.	ND527/Coteau 's'//Era	ND582	1982	ND
18.	ND537/4/ND486 's'//3/ND546// Giza 141/Na 710	ND586**	1982	ND
19.	Len//Butte*2/ND507	ND593**	1983	ND
20.	Butte*2/3/ND551//Butte*2/ND507	ND597	1983	ND
21.	Len/3/Waldron//Bage/Chris	ND603**	1983	ND
22.	Era//Tob/Cno/3/Protor	77S8002**	1982	North. King
23.	Era/B. Cimarron	77S4342**	1982	North. King
24.	Polk/Tob//Nor/Era/3/Olaf	HS79-149**	1983	N. Am. Pl. B
25.	Composite Selection	HS78-1139**	1983	N. Am. Pl. B
26.	SD2271/Sinton	HS80-236**	1983	N. Am. Pl. B
27.	Era/3/TZPP/Son 64//Chris	PR2369**	1982	Pioneer
28.	Cno 's'//Nor 66//Waldron	X7993	1982	Pioneer
29.		SBT 428	1983	Pioneer
30.	MSFRS Germplasm CC A-1977	WRP-8-1**	1982	West. Pl. Br
31.	MSFRS Germplasm CC A-1977	WRP-8-30**	1982	West. Pl. Br
32.	MSFRS DHRSP-78	WRC-80-32**	1983	West. Pl. Br
33.	K7100/Magnif 41, K 7700108	WA6922**	1982	WA
34.	K73557/Borah, K7900713	WA6923**	1982	WA

** Semidwarf

METHODS

The terminology and methods used are briefly described below:

Test Weight Per Bushel - The weight per Winchester bushel of cleaned, dry, scoured wheat. To determine the dockage-free test weight on a comparable sample, approximately one pound per bushel should be subtracted from the value given.

1000 Kernel Weight - The 1000 kernel weight was determined by counting with a Seedburo seed counter the number of kernels in a 10 g sample of cleaned, picked wheat^{5/}.

Kernel Size - The percentages of the size of the kernels (large, medium and small) were determined on a wheat sizer as described by Shuey^{6/}.

The sieves of the sizer were clothed as follows:

Top Sieve - Tyler #7 with 2.92 mm opening
Middle Sieve - Tyler #9 with 2.24 mm opening
Bottom Sieve - Tyler #12 with 1.65 mm opening

Potential Milling Yield - The potential yield is not shown on the computer tables, but it can be determined by multiplying the percentages of the overs of each sieve #7, #9 and #12 by the value of 78%, 73% and 68%, respectively. The accumulation percentage would be the potential yield.

Milling - The samples were cleaned by passing the wheat over an Emerson kicker and dockage tester and through a modified Forster scourer (Model 6). The clean, dry samples were pretempered to 12% moisture for at least 72 hours; then tempered to 16% moisture and allowed to stand overnight prior to milling.

5/ Mention of a trademark name or a proprietary product does not constitute a guarantee or warranty of the product by the U. S. Department of Agriculture, and does not imply its approval to the exclusion of other products that may also be suitable.

6/ Shuey, William C. A Wheat Sizing Technique for Predicting Flour Milling Yield. Cereal Science Today 5:71-72,75 (1960).

The Special Uniform Nursery Spring Wheat samples were milled on a Brabender Quadrumat Jr. mill. The mill was equipped with a #18 wire on the drum sieve. The throughs of the #18 wire were rebolted on a Strand sifter equipped with a #60 Tyler sieve. The sample was sifted for 1 minute. The throughs of the #60 wire classified as flour, and this was the material tested. The overs of the #18 wire were classified as bran, and the overs of the #60 Tyler sieve as crude shorts.

The Uniform Regional Nursery blends and the Field Plot Nursery samples were milled on a Buhler continuous experimental mill. This mill has been slightly modified to give results more comparable to commercial milling. The break scalping sieves were clothed with #54 stainless steel wire, the reduction scalping sieves with #58, #66 and #105 stainless steel wire for the first, second and third reduction, respectively. All of the flour sieves were clothed with #135 stainless steel wire.

All six flour streams were combined to give the patent flour. The extraction of a good milling wheat using this flow is approximately 68%. This is comparable to a commercial "long patent" extraction flour. At this flour extraction of the wheat, the changes in flour ash are most sensitive to changes in percent extraction.

Protein Content - Both the Kjeldahl procedure and the near infrared technique were used to determine protein content. Nitrogen values, as determined by the Kjeldahl procedure, were multiplied by 5.7 to calculate protein values.

Mineral Content or Ash Content - This was determined by measuring the residue of the minerals left after incinerating the sample for approximately 16 hours at 565°C. The results were reported as percentage of the sample weight.

Mixogram - The mixogram was determined by using 30 g of flour and adding 20 cc of water. The sensitivity spring setting was set at 10. All mixograms were run with constant weight of flour and volume of water. Absorptions reported were adjusted according to the height of the mixogram. The correction factor was determined from a series of flours by varying the amount of absorption.

Mixogram Pattern - The reference mixogram patterns given at the end of the report demonstrate the different types of mixograms that were obtained. A single number is assigned each pattern to characterize and simplify the classification of the curves--the larger number indicating stronger curve characteristics.

Baking Procedure or Formula - The baking formula used was as follows:

100% flour	3% milk D.S.M.
2% salt	3% yeast
5% sugar	2% shortening (Crisco, melted)

The samples were mixed to development in National Manufacturing mixers: the micro mixer for the 25 g samples and the 100 g special mixer for the 100 g samples. Bromate (7.5 ppm) for oxidation and barley malt flour (0.1%) for enzymatic supplement were added to each sample. All doughs were moulded in a Roll-Er-Up moulder.

Absorption - The amount of water, expressed as percent of the flour, required to bring the dough to proper consistency.

Crumb Color - A value was determined by comparing the loaf of the tested sample against a baking standard. This standard was selected as an average for the crop year for the spring wheat area.

Loaf Volume - The volume of the baked loaf as determined by seed displacement.

All values (protein, ash and absorption) were reported on a 14% moisture basis.

DISCUSSION

The following discussion presents some of the basic techniques and criteria used in the milling and baking quality evaluation of the samples. There are three major evaluation categories used: kernel characteristics, to characterize the kernel; milling performance, to evaluate the general milling characteristics; baking score, to evaluate the flour as to type and overall baking quality.

Each evaluation category can be important. A sample could be of a sufficiently poor quality for a given category to suggest elimination from future testing. However, a sample submitted for the first time and found to be questionable should be tested again to establish if it has a satisfactory or unsatisfactory classification. A sample which is consistently rated as questionable should be discarded.

Five characteristics (test weight, 1000 kernel weight, percent small kernels, wheat mineral and wheat protein) were independent variables used to calculate the dependent variable - wheat score. Four characteristics (percent extraction, mineral @ 65% extraction, flour protein and milling character) were used to calculate the dependent variable - mill score. Seven characteristics (mixogram pattern, bake absorption, mixing time, dough characteristics, crumb color, crumb grain and loaf volume) were used to calculate the dependent variable - bake score. These three dependent variables after calculation become independent variables used to calculate the dependent variable - general evaluation.

This is the third year our new computer program has been used, which was designed and implemented to handle the analysis and tabulation for the data from each station. This program uses the Statistical Analysis Systems (SAS Institute, Inc., SAS Circle, Box 8000, Cary, NC 27511).^{7/}

The samples are tested and data collected on 17 quality factors or variables. The program then grades each factor against predetermined faulting values and assigns major (MJ) or minor (MI) faults where applicable. The data is then broken down into 3 major areas of concern to relate more directly to agronomic, industrial and consumer requirements. Each sample is assigned a score of 4 in the areas of Wheat Characteristics, Milling Characteristics and Baking Characteristics. The program then adjusts the score (4 = Good promise, 3 = Some promise, 2 = Little promise, 1 = No promise) depending upon the number of major and/or minor faults assigned to that sample.

^{7/} Nolte, L.L., Youngs, V.L., Crawford, R.D., and Kunerth, W.H. 1985. Computer program evaluation of hard red spring wheat. Cereal Foods World 30:227-229.

A general score is also given to each sample. This score is again 1-4 and is obtained by calculating the mean of the other 3 scores.

The following tables list the variables used in each scoring area and their specific faulting and scoring values.

WHEAT SCORE

<u>Variables Included</u>	<u>Faulting Limits</u>		<u>Effect on Score</u>	
	<u>Minor</u>	<u>Major</u>	<u>Minor</u>	<u>Major</u>
Test Weight (#/bu)	57.9	56.9	-	-1
1000 Kernel Weight ^a (g)	Mean-2.1	Mean-5.1	-	-1
Small Kernels (%)	8	16	-	-1
Wheat Mineral (%)	1.71	1.81	-	-
Wheat Protein (%)	13.9	12.9	-1	-2

^a The mean, or average, is calculated using the data from the standards tested with that station.

MILL SCORE

<u>Variables Included</u>	<u>Faulting Limits</u>		<u>Effect on Score</u>	
	<u>Minor</u>	<u>Major</u>	<u>Minor</u>	<u>Major</u>
Flour Extraction ^a (%)	Mean-2.1	Mean-4.1	-1	-2
Flr. Mineral @ 65% Ex. ^b				
Large Samples	.47	.51	-	-1
Small Samples	.57	.61	-	-1
Flour Protein (%)	12.9	12.4	-1	-2
Milling Character ^c	3	2	-1	-2

^a The mean, or average, is calculated using the standards tested with that station.

^b The large samples are milled on a Buhler experimental mill, and the small samples are milled on a Quadrumat Jr. experimental mill. Different values are used to compensate for the difference in the efficiency of the two mills and their respective procedures.

^c 5 = Normal. 4 = Normal-soft. 3 = Soft-normal. 2 = Soft. 1 = Gritty. 0 = Very soft.

BAKE SCORE

<u>Variables Included</u>	<u>Faulting</u>	<u>Limits</u>	<u>Effect on Score</u>	
	<u>Minor</u>	<u>Major</u>	<u>Minor</u>	<u>Major</u>
Mixogram Pattern ^a	2,7 or 8	1, or 9-11	-	-1
Bake Absorption (%)	61.9	60.4	-1	-2
Mix Time (min.)	5.75-8.00 or 2.00-2.75	0-1.75 or over 8.00	-1	-2
Dough Characteristic ^b	6,5	4 or less	-	-2
Crumb Color ^c	6-4	3 or less	-	-1
Crumb Grain ^d	7-4	3 or less	-	-1
Loaf Volume ^e (cc)	Lg. Mean-55 Sm. Mean-21	Mean-105 Mean-31	-1 -1	-2 -2

- ^a Refer to reference mixograms for numerical curve pattern.
(1 = very weak--11 = very strong)
- ^b 9 = Elastic. 8 = Slightly elastic. 7 = Slightly pliable.
6 = Pliable. 5 = Very pliable. 4 = Very elastic.
3 = Bucky. 2 = Very, very pliable. 1 = Extremely pliable.
0 = Dead.
- ^c The column headed Crumb Color on the data tables has two scores. The first score is the brightness, or sheen, of the grain as compared to the standard(s). (Standard = 100.) The second score is a single digit indicating the color of the interior of the loaf. 9 = Bright white. 8 = White.
7 = Normal. 6 = Slightly creamy. 5 = Bright creamy.
4 = Creamy. 3 = Very creamy. 2 = Gray. 1 = Very gray.
0 = Dull.
- ^d The column on the data tables headed Crumb Grain also has two scores. The first score is a numerical comparison against the standard(s). The second score indicates the structure of the grain. 12 = Normal. 11 = Slightly irregular. 10 = Slightly open. 9 = Slightly irregular and open. 8 = Slightly open and irregular. 7 = Irregular.
6 = Open. 5 = Irregular and slightly open. 4 = Open and slightly irregular. 3 = Irregular and open. 2 = Open and irregular. 1 = Harsh. 0 = Soggy.
- ^e The mean, or average, is calculated using the standards tested with that station. "Lg." refers to the faulting and scoring values for 100 g. loaves. "Sm." refers to the faulting and scoring values for 25 g. (pup) loaves.

All samples, as in previous years, are compared with a milling and baking standard that represents a blend of the crop year blended to a known quality. However, the samples for the individual stations are evaluated against the average results of the check varieties from the respective stations. The agronomic and climatic conditions of the individual locations can affect the quality of the wheat sample, such that the evaluation at certain locations could have all samples--even the named varieties--classified as questionable to unsatisfactory. Therefore, the evaluation ratings of one station are not directly comparable with those of another station. For example, an area may produce low protein wheats which give large and plump kernels, good milling and kernel characteristics, but low protein and unsatisfactory baking properties such as short mixing time, low loaf volume and weak dough characteristics. The wheat from this area could not be considered as a strong spring wheat and would not maintain the quality expected from the spring wheat producing area. A good variety should have tolerance to a wide range of environmental conditions and the overall picture should be taken into consideration for establishing these varieties.

Kernel Characteristics are important in determining the initial value of the wheat and, if extremely poor, could disqualify a new variety from further consideration. Because of the present grading system, it is desirable to have a good test weight. If a sample has a low 1000 kernel weight and small kernel size distribution, it would be considered a poor sample for milling because of the high ratio of bran to endosperm. Therefore, it is desirable to have plump kernels. Wheat ash is an important factor when comparing a variety against other standard varieties. If a sample consistently has higher wheat mineral content, it increases the probability of having high flour ash. Lower protein than the standard varieties is not desirable, because in a low protein crop year the probability of it having such a low protein as to be undesirable is much greater. Therefore, the protein must also be considered as a characteristic when comparing varieties grown in the same locality.

Milling Performance is very important, especially the subcategory of milling characteristics. If low extraction or high flour ash is obtained, these become major factors which are quite unacceptable from a commercial milling standpoint. All flour mineral contents are reported at a constant extraction of 65%, so that the figures are directly comparable. As a rule of thumb, one can approximate that each point of ash (0.01%) is equivalent to approximately 2% in extraction.

Milling characteristics are important. A sample which tends to be soft in character requires a different milling technique to be milled properly. On commercial mills flowed for hard vitreous spring wheats, soft milling characteristics cause great difficulty. Therefore, if a sample shows softness in character, it is considered to be unsatisfactory. Likewise, a sample which is extremely hard and vitreous will cause difficulty. Both types of wheat (soft and vitreous) require different roll pressures, clothing, sifter surface and temper to be milled properly. If these wheats are blended with normal milling wheats, improper results are obtained since these characteristics are not necessarily compatible or additive. Normal to soft score indicates that the sample shows a tendency toward softness of character on the flour mill stocks and extraction. This would indicate that the sample may give some difficulty for certain mill streams, and an adjustment would either have to be made in the milling flow or in tempering procedures to compensate for these differences. The properties of this wheat may or may not be compatible with other wheats with which it may be blended; therefore, it is important to maintain varieties with milling characteristics as uniform as possible.

The amount of protein recovered in the flour for a sample is of importance. High protein wheats yielding low protein flours are not desirable. Such a wheat would have much of the protein distributed in the outer portion of the kernel which would result in excessive protein in the feed. Therefore, higher wheat protein would be necessary to yield a flour with protein content comparable to that of a wheat that gives good flour protein recovery.

Mixogram Patterns and Farinogram Patterns are important in estimating the strength and mixing tolerance or potential mixing tolerance of a flour. A long, flat curve is more desirable than a short, peaked curve; however, an extremely long curve may be undesirable, if the flour would require excessive mixing for proper development. Both the pattern and length of the curve are important, and both must be considered. Abnormal curves, such as sway-back or long initial time to incorporate the water, indicate undesirable characteristics.

Baking Evaluation takes into account the flour absorption, mixing time, dough characteristics, loaf volume and machinability. A sample which has low absorption would be unsatisfactory. A sample with extremely short mixing time would also be considered undesirable as a good strong spring wheat. When a sample is in the minimal range for these values, it is considered to be questionable until further testing demonstrates whether a definite deficiency exists.

Doughs having mellow to weak dough properties show a tendency towards weakness. Also, for mellow to strong, the dough is mellow but has a tendency to be strong, and a strong to mellow dough is just the reverse. Since these characteristics are subjective rather than objective, it is necessary at times to estimate the tendency; therefore, the necessity exists for apparent double grades.

The grain or appearance of the interior of the loaf shows how well the sample stood up during baking and may point out or explain some deficiencies which have been observed during the baking test.

Loaf volume indicates potential strength of the flour in a different manner than mixing time or dough characteristics in that it shows the ability or lack thereof for the dough to expand under pressure and to contain the entrapped gases during this expansion. Weak flours act much like rotten balloons, which burst when blown up and collapse and yield low loaf volume or extremely large volume and large holes in the interior of the loaf. Low protein flours and lifeless (dead) doughs exhibit properties similar to putty and do not expand during fermentation or baking and give low loaf volume. Tough and very bucky doughs are bound too tightly and impede expansion of the gases causing low loaf volume.

General Evaluation rating applies only to the data contained in the year of the report. However, a summation of total and major deficiencies, and an average General Evaluation score for the number of years the sample has been tested are included in the discussion of individual varieties and selections of the Uniform Regional Nursery.

UNIFORM REGIONAL NURSERY SAMPLES - 1984 CROP

Discussion of Area Blends

A total of 645 Uniform Regional Nursery samples were received. However, only 613 wheat samples were from 19 stations in 8 states were blended for this crop year by area. The areas tend to represent movement of the wheat in the market (See map, page 7). Kernel characteristics were determined on individual samples to eliminate possible erroneous results. The area blends were then milled and baked by our macro method. Thirty-two samples were received from each of the 19 stations. Twenty-seven selections were included for quality evaluation in the Uniform Regional Nursery samples. The remainder of the samples were the commercially named varieties Butte, Chris, Era, Marquis and Waldron.

Data from the southeast area blend are given in Table 1. The six stations included in this blend were Brookings, Redfield, Selby, South Dakota; Madison, Wisconsin; Morris and St. Paul, Minnesota.

Data from the northeast area blend are given in Table 2. The five stations included in this blend were Minot, Fargo, Langdon and Carrington, North Dakota and Crookston, Minnesota.

Data from the western area blend are given in Table 3. The eight stations included in this blend were Sidney, Havre and Bozeman, Montana; Williston and Dickinson, North Dakota; Sheridan, Wyoming; Pullman, Washington and Aberdeen,, Idaho. Williston, North Dakota submitted four extra samples and Pullman, Washington submitted two extra samples. These samples were processed individually, and the data are reported in Tables 4 and 5 using our 1984 Standard as the standard check.

Discussion of Area and Crop Year Averages

In Table 7 are given the average area results for the combined data of the varieties, Butte, Chris, Era and Waldron samples submitted from the 8 states and 19 stations. The area average represents all samples that were grown in that area for the year cited.

The milling and baking results were obtained from the area blend of the wheats in equal proportions from each of the stations for the respective variety or selection. The regular 100 g straight dough rich formula was used in

baking. The General Evaluation column includes the overall performance of the blend of each sample. The general evaluation given for the sample area blend may not agree with that of the individual wheat samples within the blend, since averages do not express the range, and poor characteristics may be masked. In an endeavor to clarify this problem, we have included in the discussion of the varieties and selections, the average general evaluation, the number of total deficiencies and the number of major deficiencies -- (Average General Evaluation - #Total Deficiencies/#Major Deficiencies).

Also given in Table 7 are comparisons of the previous five crop years, which include all selections grown in the Uniform Regional Nursery for that year, as well as the 5 YA. 1984 crop kernel characteristics (test weight and 1000 kernel weight) were slightly better than the 5 YA. Bake absorption was 1.7% lower, and also mixing time was slightly shorter than the 5 YA. The dough character and crumb grain was equal to the 5 YA, but the loaf volume was lower.

The General Score of the 1984 and 1983 crop results shows the 1984 crop slightly lower than the 1983 crop. The bake absorption was 0.8% lower than the 1983 crop, but the mix time, dough character, crumb color and crumb grain were equal. The loaf volume was 54 cc lower than the 1983 crop. Test weight, 1000 KWT, large kernels and flour extraction was better than the 1983 crop. However, the wheat protein was 1.0% lower.

Discussion of Individual Varieties or Selections

For simplicity and brevity, as in previous reports, each selection or variety will be discussed from the general viewpoint rather than the individual areas. General Evaluation summarizes the results from the individual areas for one crop year.

Average results of the varieties Butte, Chris and Waldron for each of the individual areas were used as standards for the other selections from that area; therefore, a variety or selection may be rated satisfactory in two different areas, but comparison of the data may show much poorer results for one area due to adverse environmental conditions. Thus the sample with poor results could be rated as having unsatisfactory quality when compared with the overall spring wheat area, even though it may be rated as showing good promise for one area.

By using the same format as used in previous years and employment of the computer, all named varieties receive a

general evaluation. Only those varieties in the "Good Promise" category could be consistently considered as acceptable to the trade both in the domestic, as well as foreign markets. Data for the named varieties of Butte, Chris, Era, Marquis and Waldron will be an average of each variety for the last three years.

<u>Butte</u>	(3.5 - 19/9)	<u>8/</u>	- Good Promise
<u>Chris</u>	(3.9 - 20/3)		- Good Promise
<u>Era</u>	(3.2 - 35/9)		- Some Promise
<u>Marquis</u>	(3.3 - 29/9)		- Some Promise
<u>Waldron</u>	(3.8 - 15/7)		- Good Promise

HS 78-1139 (3.4 - 21/8) (2 yrs.)

Faults:

Kernel Characteristics - Test weight, wheat ash, wheat protein, small kernels.

Milling Performance - Flour protein.

Baking Evaluation - Mixograph score, crumb grain, crumb color, mix time.

General Evaluation - Some promise.

HS 81-12 (3.1 - 12/3) (1 yr.)

Faults:

Kernel Characteristics - Test weight, small kernels, 1000 KWT, wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Crumb grain, crumb color, bake absorption.

General Evaluation - Some promise.

8/ (Average General Evaluation - # Total Deficiencies/Major Deficiencies)

HS 81-55 (3.6 - 7/1) (1 yr.)

Faults:

Kernel Characteristics - Wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Crumb color, crumb grain, loaf volume.

General Evaluation - Good promise.

MN 7529 (3.1 - 34/9) (3 yrs.)

Faults:

Kernel Characteristics - Wheat protein, wheat ash, test weight, small kernels.

Milling Performance - Flour protein.

Baking Evaluation - Crumb grain, loaf volume, bake absorption, dough character.

General Evaluation - Some promise.

MN 80056 (3.1 - 10/3) (1 yr.)

Faults:

Kernel Characteristics - Wheat protein.

Milling Performance- Flour protein.

Baking Evaluation - Crumb color, crumb grain, bake absorption, mix time.

General Evaluation - Some promise.

MN 81270 (3.1 - 10/2) (1 yr.)

Faults:

Kernel Characteristics - Wheat protein, small kernels.

Milling Performance - Flour protein.

Baking Evaluation - Loaf volume, crumb color, crumb grain.

General Evaluation - Some promise.

MN 82128 (2.9 - 11/3) (1 yr.)

Faults:

Kernel Characteristics - Test weight, wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Bake absorption, mixograph score, dough character, crumb grain, loaf volume.

General Evaluation - Little promise.

MT 808 (2.6 - 22/7) (1 yr.)

Faults:

Kernel Characteristics - 1000 KWT, small kernels, test weight, wheat protein.

Milling Performance - Flour extraction, flour protein, ash at 65% extraction.

Baking Evaluation - Mixograph score, bake absorption, crumb grain, crumb color.

General Evaluation - Little promise.

MT 8043 (2.5 - 38/13) (2 yrs.)

Faults:

Kernel Characteristics - Small kernels, wheat protein, wheat ash, test weight, 1000 KWT.

Milling Performance - Flour extraction, ash at 65% extraction, flour protein.

Baking Evaluation - Mixograph score, crumb grain, mix time, crumb color, bake absorption.

General Evaluation - Little promise.

MT 8177 (2.7 - 14/5) (1 yr.)

Faults:

Kernel Characteristics - Wheat protein, small kernels.

Milling Performance - Flour protein.

MT 8177 (Cont'd)

Baking Evaluation - Mixograph score, mix time, crumb grain, crumb color, dough character.

General Evaluation - Little promise.

ND 597 (3.5 - 15/5) (2 yrs.)

Faults:

Kernel Characteristics - Wheat ash, small kernels, wheat protein.

Milling Performance - Flour extraction, flour protein.

Baking Evaluation - Crumb grain, crumb color, loaf volume.

General Evaluation - Good promise.

ND 602 (3.6 - 5/2) (1 yr.)

Faults:

Kernel Characteristics - Wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Crumb grain.

General Evaluation - Good promise.

ND 603 (2.6 - 39/17) (2 yrs.)

Faults:

Kernel Characteristics - Wheat ash, small kernels, wheat protein.

Milling Performance - Flour protein, flour extraction.

Baking Evaluation - Mixograph score, mix time, dough character, crumb grain, loaf volume, bake absorption, crumb color.

General Evaluation - Little promise.

ND 604 (3.5 - 7/3) (1 yr.)

Faults:

ND 604 (Cont'd)

Kernel Characteristics - Wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Crumb color, crumb grain.

General Evaluation - Good promise.

ND 611 (3.0 - 8/4) (1 yr.)

Faults:

Kernel Characteristics - Small kernels, wheat protein.

Milling Performance - Flour extraction, flour protein.

Baking Evaluation - Crumb grain, dough character.

General Evaluation - Some promise.

RH 83-3498 (2.9 - 10/6) (1 yr.)

Faults:

Kernel Characteristics - Wheat protein, small kernels.

Milling Performance - Flour protein.

Baking Evaluation - Crumb grain, mix time, mixograph score, bake absorption, dough character.

General Evaluation - Little promise.

SD 2956 (3.0 - 11/3) (1 yr.)

Faults:

Kernel Characteristics - Small kernels, wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Bake absorption, mix time, crumb color, crumb grain.

General Evaluation - Some promise.

SD 2968 (3.1 - 7/4) (1 yr.)

Faults:

Kernel Characteristics - Wheat protein, small kernels.

SD 2968 (Cont'd)

Milling Performance - Flour protein.

Baking Evaluation - Crumb grain.

General Evaluation - Some promise.

SD 8026 (3.6 - 14/5) (2 yrs.)

Faults:

Kernel Characteristics - Wheat ash, small kernels, wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Crumb grain, crumb color, loaf volume.

General Evaluation - Good promise.

SD 8036 (2.9 - 10/3) (1 yr.)

Faults:

Kernel Characteristics - Wheat protein.

Milling Performance - Flour extraction, flour protein.

Baking Evaluation - Bake absorption, crumb grain.

General Evaluation - Little promise.

WA 7075 (3.1 - 11/4) (1 yr.)

Faults:

Kernel Characteristics - Small kernels, test weight, wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Crumb color, crumb grain, loaf volume.

General Evaluation - Some promise.

WA 7182 (2.6 - 21/7) (1 yr.)

Faults:

WA 7182 (Cont'd)

Kernel Characteristics - Small kernels, wheat protein, test weight, 1000 KWT.

Milling Performance - Flour extraction, ash at 65% extraction, flour protein.

Baking Evaluation - Crumb color, crumb grain, mix time.

General Evaluation - Little promise.

WA 7185 (2.9 - 11/4) (1 yr.)

Faults:

Kernel Characteristics - Test weight, 1000 KWT, small kernels, wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Bake absorption, dough character, loaf volume.

General Evaluation - Little promise.

WRC 80-3 (2.9 - 11/4) (1 yr.)

Faults:

Kernel Characteristics - Wheat protein, test weight, small kernels.

Milling Performance - Flour protein.

Baking Evaluation - Crumb grain, crumb color, bake absorption.

General Evaluation - Little promise.

WRC 80-32 (3.2 - 6/2) (1 yr.)

Faults:

Kernel Characteristics - Wheat protein.

Milling Performance - Flour protein, flour extraction.

Baking Evaluation - Crumb grain, loaf volume.

General Evaluation - Some promise.

X 7993 (3.4 - 24/10) (3 yrs.)

Faults:

Kernel Characteristics - Wheat ash, wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Mix time, mixograph score, crumb grain, dough character, bake absorption.

General Evaluation - Some promise.

PR 2369 (2.9 - 45/21) (3 yrs.)

Faults:

Kernel Characteristics - Wheat ash, wheat protein, small kernels.

Milling Performance - Flour protein.

Baking Evaluation - Mixograph score, mix time, crumb grain, dough character, loaf volume, bake absorption.

General Evaluation - Little promise.

1984 UNIFORM REGIONAL HARD RED SPRING WHEAT
NURSERY SAMPLES NOT INCLUDED
IN THE AREA BLENDS

WILLISTON, NORTH DAKOTA

The 1984 milling and baking standard was used as the standard. The three varieties and one selection were Alex, Len, Stoa and ND 600. The data for these samples are given in Table 4.

PULLMAN, WASHINGTON

The 1984 milling and baking standard was used as the standard. The one variety and one selection were Wampum and NK 751. The data for these samples are given in Table 5.

TETONIA, IDAHO

This station was not included in the area blends because of kernel characteristics. The varieties used as standards were Butte, Chris and Waldron. The data for these samples are given in Table 6.

FIELD PLOT NURSERY SAMPLES - 1984 CROP

Sixty samples were received from three states at five stations. The data for the individual samples are given in Tables 8-12.

PINAL COUNTY - ARIZONA

Seven samples were received from this station using Oslo and Yecora Rojo as the standards. The data for these samples are given in Table 8. The average general score for this station was 2.0.

IMPERIAL VALLEY - CALIFORNIA

Twenty-three samples were received from this station. Our 1983 standard was used as the standard for this station. The data for these samples are given in Table 9. The average general score for this station was 1.7.

MESA - ARIZONA

Sixteen samples were received from this station using Yecora Rojo and 906R as the standards. The data for these samples are given in Table 10. 2.1 is the average general score for this station.

MINOT AND LANGDON - NORTH DAKOTA

Seven named varieties were received from each of these stations. Butte, Len and Waldron were used as the standards. The data for samples are given in Tables 11 and 12. The average general score is 3.6 for Minot and 3.8 for Langdon.

EXPLANATION OF ABBREVIATIONS LISTED UNDER THE
HEADINGS AND THOSE THAT MAY BE LISTED UNDER
MINOR AND MAJOR DEFICIENCIES ON COMPUTER PRINTOUT

TW = Test Weight
KW = 1,000 Kernel Weight
LG = Large Kernels
SM = Small Kernels

WM = Wheat Mineral
WP = Wheat Protein
EX = Flour Extraction
M65 = Mineral at 65% Flour Extraction

FP; FLR PRO = Flour Protein
MC; MLG CHAR = Milling Characteristics
MLG PER = Milling Performance
MIX ABS = Mixograph Absorption

MX; MIX PAT = Mixograph Pattern Score
BA; BAKE ABS = Actual Bake Absorption
MT; MIX TIME = Actual Dough Mixing Requirements

DC; DOUGH CHAR = Dough Handling Characteristics
CC; CRUMB COLOR = Example - 100 5
100 = Score received for brightness of the
crumb grain
5 = Creamy-the color characteristic of
that particular loaf (only the
second score is faulted)

CG; CRUMB GRAIN = Example - 86 5
86 = Score received for crumb grain
5 = Open-or characteristic of that
loaf's crumb grain (only the
second score is faulted)

LV; LOAF VOL = Loaf Volume

FOOTNOTES FOR TABLES

These footnotes are applicable for specified column headings in all tables that follow

<u>Column Heading</u>	<u>Footnote</u>
TEST WT	Clean dry - Subtract 1 lb/bu for dockage-free TW.
WHT ASH, WHT PRO, ASH @ 65%, FLR PRO, BAKE ABS (100 g loaf)	14% Moisture basis.
MILL CHAR	5 = Normal. 4 = Normal-soft. 3 = Soft-normal. 2 = Soft. 1 = Gritty. 0 = Very soft.
MIX PAT	Refer to reference mixograms for numerical curve pattern. (1 = Very weak - - - 11 = Very strong.)
DOUGH CHAR	9 = Elastic. 8 = Slightly elastic. 7 = Slightly pliable. 6 = Pliable. 5 = Very pliable. 4 = Very elastic. 3 = Bucky. 2 = Very, very pliable. 1 = Extremely pliable. 0 = Dead.
CRUMB COLOR	First column: A realistic score of brightness compared with a 1984 ND standard scored as 100. Second column: 9 = Bright white. 8 = White. 7 = Normal. 6 = Slightly creamy. 5 = Bright creamy. 4 = Creamy. 3 = Very creamy. 2 = Gray. 1 = Very gray. 0 = Dull.
CRUMB GRAIN	First column: A relative overall crumb grain score as compared with a 1984 ND standard scored as 90. Second column: 12 = Normal. 11 = Slightly irregular. 10 = Slightly open. 9 = Slightly irregular and slightly open. 8 = Slightly open and slightly irregular. 7 = Irregular. 6 = Open. 5 = Irregular and slightly open. 4 = Open and slightly irregular. 3 = Irregular and open. 2 = Open and irregular. 1 = Harsh. 0 = Soggy.

QUALITY DATA OF SPRING WHEAT SAMPLES 1984 CROP

STATION=SEASIDE STATION=SOUTHEASTERN AREA FURSFA=UNIFORM

TABLE 1

VARIETY	TEST WT #/BU	STD #/BU	1000 SIZING		WHT %	ASH %	PRO %	SCCRF %	EXT %	E5%FX %	FLR %	ASH @ %	FLR	MILL CHAR	SCCRF %	# * #	ABS	PAT %	MIX	MIX
			K.WT G.	LG %																
AUTTE	61.7	5	1.64	12.6	2	1.88	14.1	2	7.0	0.76	71.6	0.42	12.9	12.9	4	62.5	4	62.5	4	
CHRIS	60.9	5	1.64	12.6	2	1.82	12.0	2	7.1	0.41	13.7	0.41	11.7	11.7	4	59.3	4	59.3	4	
ERA	59.8	5	1.64	12.6	2	1.88	12.7	2	7.0	0.41	13.7	0.41	11.7	11.7	4	59.7	4	59.7	4	
MARQUIS	58.9	5	1.64	12.6	2	1.88	12.7	2	7.1	0.41	12.2	0.45	11.2	11.2	5	61.6	5	61.6	5	
VALDRON	59.7	5	1.64	12.6	2	1.94	13.7	2	7.1	0.41	12.2	0.45	11.2	11.2	5	62.5	5	62.5	5	
HS 78-113	58.1	5	1.64	12.6	2	1.92	12.8	2	7.0	0.41	11.9	0.42	11.9	11.9	5	60.0	5	60.0	5	
HS 81-12	60.6	5	1.64	12.6	2	1.84	12.1	2	7.1	0.41	11.9	0.41	11.9	11.9	5	62.3	5	62.3	5	
HS 81-55	61.3	5	1.64	12.6	2	1.73	13.0	2	7.1	0.41	11.7	0.41	11.7	11.7	5	60.7	4	60.7	4	
HS 81-55	61.8	5	1.64	12.6	2	1.72	11.7	2	7.1	0.41	11.7	0.41	11.7	11.7	5	61.0	5	61.0	5	
HS 75.2	61.8	5	1.64	12.6	2	1.69	12.5	2	7.2	0.39	11.6	0.42	11.6	11.6	5	62.5	4	62.5	4	
HS 80056	60.2	5	1.64	12.6	2	1.93	12.6	2	7.0	0.41	11.5	0.42	11.5	11.5	5	62.5	5	62.5	5	
HS 8127C	59.2	5	1.64	12.6	2	1.69	11.7	2	7.1	0.41	11.4	0.41	11.4	11.4	5	60.0	7	60.0	7	
SH 8212B	56.4	5	1.64	12.6	2	1.89	12.9	1	6.6	0.46	11.8	0.46	11.8	11.8	4	61.6	6	61.6	6	
SH 808	56.4	5	1.64	12.6	2	1.75	11.7	1	6.5	0.47	10.3	0.47	10.3	10.3	4	62.5	6	62.5	6	
WT 8043	60.3	5	1.64	12.6	2	1.74	12.7	2	7.0	0.40	11.6	0.40	11.6	11.6	5	65.3	5	65.3	5	
WT 8177	60.3	5	1.64	12.6	2	1.67	13.1	3	6.9	0.39	11.4	0.40	11.4	11.4	5	62.3	3	62.3	3	
WT 597	61.4	5	1.64	12.6	2	1.67	13.1	3	6.9	0.39	11.6	0.40	11.6	11.6	5	61.6	6	61.6	6	
ND 602	61.1	5	1.64	12.6	2	1.76	13.6	3	7.1	0.40	12.7	0.40	12.7	12.7	5	59.7	5	59.7	5	
ND 603	61.0	5	1.64	12.6	2	1.75	13.0	3	7.0	0.40	11.7	0.35	11.7	11.7	2	62.3	2	62.3	2	
ND 604	61.1	5	1.64	12.6	2	1.75	13.4	3	7.1	0.40	12.3	0.39	12.3	12.3	4	61.3	6	61.3	6	
ND 611	60.4	5	1.64	12.6	2	1.65	12.9	2	6.9	0.41	11.6	0.40	11.6	11.6	5	61.7	4	61.7	4	
SH 83-3498	61.1	5	1.64	12.6	2	1.67	12.6	2	6.9	0.38	11.8	0.38	11.8	11.8	5	62.8	5	62.8	5	
SD 2956	61.2	5	1.64	12.6	2	1.70	12.9	3	1.67	12.3	7.0	0.37	11.1	11.1	5	59.7	4	59.7	4	
SD 2968	61.1	5	1.64	12.6	2	1.84	4.5	2	1.64	12.0	7.2	1.1	0.36	11.9	2	61.3	6	61.3	6	
SD 8026	60.9	5	1.64	12.6	2	1.74	5.0	2	1.76	12.5	2	7.1	0.40	11.8	2	60.0	6	60.0	6	
SD 8036	61.5	5	1.64	12.6	2	1.67	12.5	2	6.8	0.37	11.3	0.34	11.3	11.3	5	62.5	4	62.5	4	
WA 7075	57.5	5	1.64	12.6	2	1.75	12.4	2	7.0	0.36	11.6	0.38	11.6	11.6	5	63.5	6	63.5	6	
WA 7182	53.8	5	1.64	12.6	2	1.02	12.6	1	6.6	0.49	11.6	0.49	11.6	11.6	4	58.1	6	58.1	6	
WA 7185	57.5	5	1.64	12.6	2	1.78	1.8	2	1.79	12.2	2	6.9	0.41	11.0	5	60.0	6	60.0	6	
WR 80-3	59.1	5	1.64	12.6	2	1.03	3.9	3	1.77	11.7	2	7.0	0.36	10.3	5	62.5	4	62.5	4	
WR 80-32	60.0	5	1.64	12.6	2	1.69	12.1	2	7.1	0.39	10.9	0.39	10.9	10.9	5	61.3	8	61.3	8	
X7993	60.5	5	1.64	12.6	2	1.76	12.8	2	7.0	0.33	11.2	0.42	11.2	11.2	5	62.2	2	62.2	2	
2396	60.2	5	1.64	12.6	2	1.81	12.5	3	7.0	0.42	11.2	0.42	11.2	11.2	5	62.2	2	62.2	2	

QUALITY DATA OF SPRING WHEAT SAMPLES 1984 CRCP

TABLE 1 (Cont.)

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL CC	BAKE SCORE ***	GENERAL SCORE ****				DEFICIENCIES TW KW SM WP EX A65 FP MC MX BA MT DC CC CG LV				NURSEPHY=UNIFORM	
									TW	KW	SM	WP	EX	A65	FP	MC	MX	
BUTIE	S	63.1	3.75	8	100	4	87	3	785	3	3.3							MI VJ
CHRIS	S	62.9	2.75	9	101	7	86	3	865	3	3.3							NJ
FRA	S	59.8	4.25	9	102	8	88	13	890	2	2.0							MI VJ
MARQUIS	S	60.0	4.25	8	102	8	88	7	825	2	2.0							NJ
VAL D'OR	S	62.0	3.75	9	100	7	87	7	860	4	3.0							NJ
HS 78-1139	S	63.0	3.00	7	100	6	87	3	810	3	2.3							NJ
HS 81-112	S	60.5	3.50	8	100	6	88	7	815	3	2.3							NJ
HS 81-55	S	62.5	4.75	9	100	4	87	7	835	4	3.0							NJ
HS 7529	S	61.2	3.50	7	101	7	88	7	775	2	2.0							NJ
MN 80056	S	61.6	3.25	8	101	6	89	11	825	3	2.3							MI
MN 81270	S	63.4	3.50	8	101	7	89	7	845	4	2.7							NJ
MN 82128	S	60.7	2.25	6	100	8	90	7	725	1	1.7							MI NJ
WT 808	S	61.0	5.25	9	101	7	89	6	885	3	1.7							NJ
WT 8043	S	62.5	5.75	9	100	6	87	7	855	3	2.0							MI
WT 6177	S	63.1	5.50	4	101	4	88	7	855	2	2.0							NJ
ND 597	S	65.0	4.50	8	101	4	96	7	825	4	3.0							NJ
ND 602	S	62.8	4.25	9	101	7	87	4	825	3	3.0							NJ
ND 603	S	59.5	7.00	3	102	8	85	3	735	1	2.0							NJ
ND 604	S	62.8	5.00	5	103	7	87	7	860	4	3.0							MI
ND 611	S	62.8	4.25	4	100	7	88	7	825	2	2.0							NJ
GH 83 3498	S	60.4	6.00	5	101	8	87	3	875	1	1.7							NJ
SD 2556	S	60.6	2.75	8	100	4	87	8	795	2	2.0							MI MI
SD 2968	S	62.2	4.50	9	101	7	88	7	795	4	2.7							NJ
SD 8026	S	62.2	4.75	9	99	4	89	11	875	4	2.7							NJ
SD 8036	S	61.9	4.00	9	101	7	88	7	850	3	2.0							MI
WA 7075	S	63.2	4.25	9	101	6	87	4	850	3	2.3							NJ
WA 7182	S	64.7	6.00	9	102	5	90	13	825	1	1.7							MI MJ
WA 7185	S	58.7	5.50	4	100	7	90	13	785	1	1.7							NJ
WRC 80-3	S	60.5	4.50	5	101	6	89	11	810	3	2.3							MI
WRC 80-32	S	62.7	4.25	5	101	7	88	7	820	4	2.7							NJ
X7993	S	61.8	6.00	9	101	7	82	4	885	1	1.7							NJ
2396	S	69.3	7.25	7	100	7	87	7	860	1	1.7							NJ

DEFICIENCIES
MINOR FAULTING VALUES 57.9
MAJOR FAULTING VALUES 56.9
TW KW SM WP EX A65 FP MC MX BA MT DC CC CG LV
*** 1=LNC PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE

MIX TIME (MT)
5.75-8.00 2.00-2.75
UNDER 1.75 OVER 8.00
DC CC CG LV
6 6 6 782
3 4 3 732

QUALITY DATA OF SPRING WHEAT SAMPLES 1984 CRCP

TABLE 2 (Cont.)

STATE=REGIONAL BLENDS STATION=NORTHFASTERN AREA NURSERY=UNIFORM

DEFICIENCIES	T _m	KW	SM	WP	EX	A65	FP	MC	MX	BA	MIX TIME (NT)	CC	CG	LV
MINOR FAULTING VALUES	57.9	26.7	8	13.9	69.1	•47	12.9	3	27.8	61.9	5.75-8.00	6	8	820
MAJOR FAULTING VALUES	56.9	26.7	18	12.9	67.1	•51	12.4	2	16.11	60.4	UNDER 1.75 OVER 8.00	4	3	780

*** I=NC PRCMISE 2=LITTLE PRCMISE 3=SOME PRCMISE 4=GOOD PRCMISE .

QUALITY DATA OF SPRING WHEAT SAMPLES 1984 CROP

TABLE 3 STATE=REGIONAL BLENDS STATION=WESTERN AREA NURSERY=UNIFORM

VARIETY	STD #/BU	WT G.	K.WT %	LG %	SM %	ASH %	PRO *** %	SCORE ** %	EXT %	65%EX %	PRO %	CHAR	SCORE *** %	MIX ABS	PAT %
BUTTE	S	59.3	27.0	14	9	1.62	15.3	4	69.6	0.36	13.9	5	4	64.4	5
C-GRIS	S	58.5	25.3	5	9	1.61	16.0	4	69.4	0.38	15.7	5	4	63.2	5
ERA	S	57.6	24.4	5	14	1.77	14.4	4	69.4	0.43	13.4	4	4	61.9	5
MARQUIS	S	58.8	27.8	13	8	1.57	15.7	4	67.6	0.44	14.9	4	4	66.3	3
WALDRON	S	57.6	28.4	21	6	1.75	15.9	4	69.1	0.44	15.7	4	4	66.6	6
HS 78-1139	S	56.8	27.1	9	11	1.69	15.1	3	73.0	0.44	14.8	5	4	64.4	3
HS 81-12	S	57.5	25.8	4	14	1.69	14.4	4	70.6	0.42	13.8	5	4	64.2	5
HS 81-55	S	58.6	29.3	17	7	1.69	15.2	4	70.0	0.42	14.7	5	4	64.4	5
MN 7529	S	57.4	29.3	19	10	1.64	14.4	4	69.5	0.41	13.9	5	4	65.0	5
MN 80056	S	60.4	33.4	16	4	1.57	15.0	4	70.9	0.36	13.6	4	4	62.3	4
MN 81270	S	58.3	27.0	6	11	1.63	14.8	4	69.9	0.43	13.9	4	4	64.7	4
MN 82128	S	57.8	30.4	19	6	1.65	14.5	4	68.3	0.42	14.2	5	4	63.8	3
MT 808	S	56.8	23.4	2	19	1.73	14.9	2	66.6	0.47	14.5	4	3	63.5	7
MT 8043	S	57.0	28.5	7	17	1.61	14.0	3	65.7	0.42	13.5	4	3	62.8	7
MT 8177	S	58.5	29.2	11	9	1.57	14.6	4	70.0	0.40	14.3	5	4	63.5	10
ND 597	S	58.8	34.8	14	8	1.39	15.6	4	66.8	0.40	14.9	4	3	67.3	6
ND 602	S	59.4	27.0	6	7	1.66	16.0	4	69.3	0.39	15.1	5	4	65.0	5
ND 603	S	58.3	30.8	17	9	1.61	15.0	4	67.3	0.38	13.9	5	3	61.3	11
ND 604	S	58.0	27.9	16	7	1.69	15.8	4	69.4	0.41	15.5	5	4	66.6	6
ND 611	S	58.1	29.2	7	19	1.58	15.2	3	66.8	0.42	14.7	4	3	64.7	5
ND 33 3498	S	59.3	28.9	14	8	1.66	15.3	4	68.0	0.40	14.9	4	3	65.0	5
SJ 2956	S	59.2	28.7	9	3	1.62	14.8	4	68.5	0.37	14.5	5	4	61.6	3
SJ 2968	S	58.2	29.5	13	10	1.77	14.8	4	70.0	0.40	14.1	5	4	63.8	6
SJ 3026	S	58.3	29.8	13	9	1.61	15.6	4	69.3	0.42	15.4	5	4	64.2	5
SJ 8030	S	60.4	29.1	19	4	1.55	14.8	4	67.1	0.37	14.0	4	3	64.2	4
WA 7075	S	56.4	29.4	15	8	1.65	15.0	3	69.8	0.42	14.8	5	4	63.8	6
WA 7182	S	56.3	27.3	10	17	1.77	15.7	2	66.4	0.50	15.5	4	3	67.0	6
WA 7185	S	57.2	26.5	5	11	1.55	14.6	4	69.3	0.40	14.2	5	4	61.3	6
WRC 80-32	S	57.3	27.7	16	8	1.55	13.9	3	69.8	0.43	13.3	5	4	63.2	5
WRC 80-32	S	59.0	29.7	16	7	1.52	14.4	4	68.4	0.41	13.2	5	4	63.8	4
X7993	S	58.3	30.8	24	5	1.70	15.7	4	69.6	0.40	15.2	5	4	63.2	8
2159	S	59.2	28.6	11	9	1.67	15.0	0	68.9	0.40	14.5	4	4	61.9	11

QUALITY DATA OF SPRING WHEAT SAMPLES 1984 CROP

TABLE 3 (Cont.)

STATE=REGIONAL BLENDS STATION=WESTERN AREA NURSERY=UNIFORM

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	GRAIN CC	GENERAL SCORE ***	DEFICIENCIES					NURSERY=UNIFORM								
								TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MT	DC	CC	CG
BUTTE	S	64.8	3.25	9	100	7	88	3	915	3	3.7										
CHRIS	S	63.6	3.00	8	100	7	89	11	900	4	4.0										
ERA	S	62.4	3.75	8	101	7	88	7	905	4	4.0										
MARQUIS	S	66.7	4.00	8	99	7	87	3	910	3	3.7										
WALDRON	S	67.3	5.00	9	99	7	87	4	950	3	3.7										
HS 78-1139	S	65.5	3.00	9	99	7	87	3	940	3	3.3										
HS 81-12	S	64.7	5.00	9	101	7	87	7	940	4	4.0										
HS 81-55	S	65.1	4.00	8	101	6	88	7	950	4	4.0										
MT 7529	S	65.7	4.00	8	101	7	88	7	900	4	4.0										
AN 80056	S	62.9	3.00	8	101	4	87	4	875	3	3.7										
MN 81270	S	65.7	3.25	8	101	6	88	7	855	3	3.7										
MN 92128	S	64.7	3.00	8	100	7	90	13	910	4	4.0										
MT 808	S	64.8	5.25	9	100	4	87	7	925	4	3.0										
MT 8043	S	63.9	4.75	9	100	4	88	7	1030	4	3.3										
AT 8177	S	64.1	7.75	4	100	7	89	11	895	1	3.0										
ND 597	S	68.3	3.25	8	101	7	88	7	870	4	3.7										
ND 602	S	65.7	4.00	9	99	7	87	7	955	4	4.0										
ND 603	S	62.3	8.00	4	101	4	87	4	820	1	2.7										
ND 604	S	67.5	5.00	8	101	4	87	3	925	3	3.7										
ND 611	S	65.3	4.00	9	100	7	86	7	945	4	3.3										
RD 83 3498	S	62.4	4.25	4	103	9	86	3	970	4	3.0										
SD 2956	S	62.3	3.00	8	100	7	89	13	895	4	4.0										
SD 2968	S	64.5	4.00	9	102	8	89	13	925	4	4.0										
SD 8026	S	64.9	3.75	7	100	6	88	7	820	3	3.7										
SD 8036	S	65.3	3.00	9	101	7	86	4	945	3	3.3										
WA 7075	S	65.1	4.75	9	101	4	87	7	845	3	3.3										
WA 7182	S	68.1	4.75	9	100	4	88	7	955	4	3.0										
WA 7185	S	62.2	5.25	8	101	7	89	13	840	3	3.7										
WRC 80-3	S	64.1	4.00	9	100	7	88	7	900	4	3.7										
WRC 80-32	S	64.7	4.25	8	100	7	89	13	820	3	3.7										
X7993	S	64.1	4.75	9	100	7	89	11	950	4	4.0										
2369	S	62.9	8.50	4	101	7	88	8	895	1	MI										

DEFICIENCIES
MINOR FAULTING VALUES 57.9 TW KW SM WP EX A65 FP MC MG MIX TIME (INT)
MAJOR FAULTING VALUES 56.9 24.8 21.8 13.9 67.4 47 12.9 12.4 2 1.9-11 60.4 5.75-8.00 2.00-2.75
UNDER 1.75 OVER 8.00 4 3 4 3 4 817

*** 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

QUALITY DATA OF SPRING WHEAT SAMPLES 1984 CROP

TABLE 4

STATE=NORTH DAKOTA STATION=WILLISTON NURSERY=UNIFORM

VARIETY	STD	TEST WT #/BU	1000 KWT G.	SIZING			WHT	WHEAT PRO X	FLR	ASH a EXT X	MILL CHAR X	MILL PRO X	MIX SCORE *** X	MIX ABS X	PAT	
				LG	SM	ASH X										
1934 N.D.	STD	S	62.3	34.7	63	1	1.54	14.4	4	64.3	0.43	13.7	5	4	63.8	6
ALEX			56.3	22.2	2	15	1.82	18.3	2	52.3	0.58	18.1	3	1	70.6	10
LEN			53.3	29.7	2	13	1.91	18.3	3	55.1	0.86	17.6	3	1	71.2	10
STDA			53.9	21.4	0	23	1.86	18.4	1	54.4	0.55	18.0	3	1	70.3	9
ND 600			55.4	22.0	0	21	1.64	17.7	1	55.0	0.52	17.5	3	1	70.0	11

VARIETY	STD	BAKE ABS X	MIX TIME MIN	DOUGH			CRUMB COLOR GRAIN	LOAF VOL CC	BAKE SCORE *** X	GENERAL SCORE ***	DEFICIENCIES																	
				BAKE TIME MIN	CHAR	CRUMB COLOR GRAIN					TW KW SM WP EX A65 FP MC BA MT HX EX BA DC CC CG LV	TW	KW	SM	WP	EX	A65	FP	MC	BA	MT	HX	EX	BA	DC	CC	CG	LV
1984 N.D.	STD	S	63.8	4.75	9	100	6	89	8	190	4	4.0																
ALEX			70.6	6.25	9	98	4	84	3	203	1	1.3																
LEN			71.2	7.25	9	100	3	85	4	194	1	1.7																
STDA			70.3	6.00	9	97	4	85	3	200	1	1.0																
ND 600			70.0	10.50	4	100	4	84	3	213	1	1.0																

DEFICIENCIES	MINOR FAULTING VALUES	TW	KW	SM	WP	EX	A65	FP	MC	BA	MT	HX	EX	BA	DC	CC	CG	LV	MIX TIME (MT)					
MINOR FAULTING VALUES	56.9	29.6	18	12.9	60.2	.61	12.4	2	1.9-11	60.4	4	3	4	1.75	OVER 8.00	4	3	4	1.59					
MAJOR FAULTING VALUES																								

** 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

QUALITY DATA OF SPRING WHEAT SAMPLES 1984 CROP

STATE=WASHINGTON STATION=PULLMAN NURSERY=UNIFORM

TABLE 5

VARIETY	STD	TEST	1000	SIZING	WHT	WHT	WHEAT	FLR	ASH	FLR	MILL	MILL	MIX	MIX		
		WT	K.WT	LG	SM	ASH	PRO	SCORE	EXT	65XEX	PRO	CHAR	SCORE	ABS	PAT	
		#/BU	G.	X	X	%	X	X	X	X	X	X	X	X	X	
1984 N.D.	STD	S	62.3	34.7	63	1	1.54	14.4	4	64.3	0.43	13.7	5	4	63.8	6
WAMPUM			60.2	30.7	9	4	1.21	11.6	2	56.0	0.41	11.4	3	1	63.5	6
NK 751			60.3	33.0	11	4	1.20	12.2	2	56.2	0.40	11.9	3	1	63.5	6

VARIETY	STD	BAKE	MIX	DOUGH	CRUMB	CRUMB	LOAF	BAKE	GENERAL	DEFICIENCIES																		
		ABS	TIME	CHAR	COLOR	GRAIN	VOL	SCORE	***	TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MT	DC	CC	CG	LV				
		X	X	X	X	X	X	X	X																			
1984 N.D.	STD	S	63.8	4.75	9	100	6	89	8	190	4	4.0																
WAMPUM			63.5	5.25	8	101	4	88	11	173	4	2.3																
NK 751			63.5	4.25	8	102	8	89	12	171	4	2.3																

VARIETY	STD	TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	1.9-11																	
1984 N.D.	STD	S	63.8	4.75	9	100	6	89	8	190	4	4.0																	
WAMPUM			63.5	5.25	8	101	4	88	11	173	4	2.3																	
NK 751			63.5	4.25	8	102	8	89	12	171	4	2.3																	

DEFICIENCIES	TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	1.9-11	BA	1.9-11	BA	1.9-11	BA	1.9-11	BA	1.9-11	BA	1.9-11	BA	1.9-11	BA	1.9-11			
MINOR FAULTING VALUES	57.9	32.6	8	13.9	62.2	.57	12.9	3	2.7.8	61.9	5.75-8.00	2.00-2.75	6	CC	CG	LV												
MAJOR FAULTING VALUES	56.9	29.6	18	12.9	60.2	.61	12.4	2	1.9-11	60.4	UNDER 1.75	OVER 8.00	4	3	8	159												
DEFICIENCIES	TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	1.9-11	BA	1.9-11	BA	1.9-11	BA	1.9-11	BA	1.9-11	BA	1.9-11	BA	1.9-11	BA	1.9-11	BA	1.9-11	
MINOR FAULTING VALUES	57.9	32.6	8	13.9	62.2	.57	12.9	3	2.7.8	61.9	5.75-8.00	2.00-2.75	6	CC	CG	LV												
MAJOR FAULTING VALUES	56.9	29.6	18	12.9	60.2	.61	12.4	2	1.9-11	60.4	UNDER 1.75	OVER 8.00	4	3	8	159												

**=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

QUALITY DATA OF SPRING WHEAT SAMPLES 1984 CROP 1/

TABLE 6

QUALITY DATA OF SPRING WHEAT SAMPLES 1984 CROP

TABLE 6 (Cont'd.)

STATE=IDAHO STATION=TETONIA NURSERY=UNIFORM

DEFICIENCIES	TW	KW	WP	EX	A65	FP	MC	MX	MIX	TIME (MT)	DC	CC	CG	LV
MINOR FAULTING VALUES	57.9	29.8	13.9	41.3	•57	12.9	3	2.7.8	BA	5.75-8.00	6	6	8	121
MAJOR FAULTING VALUES	56.9	26.8	12.9	39.3	•61	12.4	2	1.9-11	61.9	2.00-2.75	6	6	8	111
									UNDER	1.75 OVER 8.00	4	3	4	111

*** 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

TABLE 7

AREA AND CROP-YEAR AVERAGES

VARIETY	TEST WT #/BU	1000 KWT G.	SIZING %	WHT %	WHEAT PRO %	FLR SCORE %	ASH %	FLR %	ASH %	FLR %	ASH %	FLR %	MILL %	MILL %	MIX ABS	MIX %	PAT
***WESTERN AREA ***																	
BUTTE	S	59.3	27.0	14	9	1.62	15.3	4	69.6	0.36	13.9	5	4	64.4	5		
CHRIS	S	58.5	25.3	15	5	1.61	16.0	4	69.8	0.38	15.7	4	4	63.2	3		
RA	S	57.6	24.4	14	14	1.77	14.4	4	69.4	0.43	13.4	5	4	61.9	5		
ALDRON	S	57.6	28.4	21	6	1.75	15.9	4	69.1	0.44	15.7	5	4	66.6	6		
AREA AVERAGE	S	56.2	28.5	12	10	1.64	15.0	4	69.9	0.41	14.5	5	4	63.9	6		
***NORTHEASTERN AREA ***																	
BUTTE	S	63.8	32.6	34	1	1.54	13.7	3	71.1	0.31	12.7	5	3	65.0	4		
CHRIS	S	61.9	28.0	22	2	1.55	14.6	4	71.0	0.35	13.7	5	4	63.2	4		
RA	S	62.3	31.0	31	3	1.63	12.9	2	72.3	0.39	12.0	5	2	61.0	4		
ALDRON	S	61.7	32.8	49	2	1.65	14.0	4	71.5	0.39	13.7	5	4	65.0	5		
AREA AVEPACF	S	62.1	34.1	39	3	1.60	13.7	3	70.4	0.38	13.1	5	4	63.0	4		
***SOUTHEASTERN AREA ***																	
BUTTE	S	61.7	31.3	40	1	1.64	12.6	2	71.6	0.35	11.4	5	2	62.5	4		
CHRIS	S	60.8	29.6	27	2	1.62	14.1	4	70.1	0.40	12.9	5	3	62.5	4		
RA	S	59.8	28.0	23	4	1.62	12.0	2	71.3	0.41	13.7	5	2	59.3	4		
ALDRON	S	59.7	32.7	48	1	1.84	13.7	5	71.1	0.45	12.2	5	2	61.6	5		
AREA AVERAGE	S	59.6	32.1	38	2	1.76	12.6	2	70.4	0.49	11.4	5	2	61.3	5		
***CROPS - YARDAGEES ***																	
780 AVERAGE	S	50.4	31.1	32	4	1.71	14.4	4	70.0	0.39	13.7	5	4	65.7	6		
980 AVERAGE	S	58.9	29.7	23	5	1.66	14.2	4	69.5	0.39	13.3	5	4	64.1	7		
932 AVERAGE	S	59.9	32.2	36	4	1.68	14.7	4	70.5	0.38	13.9	5	4	65.9	5		
983 AVERAGE	S	59.4	30.6	19	4	1.81	14.7	4	68.8	0.39	13.7	5	4	64.0	5		
964 AVERAGE	S	60.6	31.5	30	5	1.66	13.7	3	69.9	0.39	13.0	5	4	62.7	5		
98C-84 AVG	S	59.5	31.1	28	4	1.70	14.3	4	69.7	0.39	13.5	5	4	64.5	4		

TABLE 7 (Cont.)
QUALITY DATA OF UNIFORM REGIONAL BLENDS
AREA AND CROP-YEAR AVERAGES

VARIETY	STD	BAKE AHS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL CC	BAKE SCORE ***	DEFICIENCIES--TW KW SM WA WP EX A65 FP MC MX BA MT DC CG LV							
									TW	KW	SM	WA	WP	EX	A65	FP
***WESTERN AREA ***																
BUTTE	S	64.8	3.25	9	100	7	88	3	915	3	3.7					
CHRIS	S	63.6	2.00	8	100	7	89	11	900	4	4.0					
ERA	S	62.4	3.75	8	101	7	88	7	905	4	4.0					
WALDRON	S	67.3	5.00	9	99	7	87	4	950	3	3.7					
AREA AVERAGE	S	64.7	4.50	8	100	6	88	7	909	4	4.0					
***NORTHEASTERN AREA ***																
BUTTE	S	65.5	3.25	8	100	7	87	7	870	4	3.3					
CHRIS	S	63.7	3.75	8	102	8	87	7	900	4	4.0					
ERA	S	61.7	4.00	8	101	7	87	4	865	2	2.0					
WALDRON	S	65.7	4.00	8	100	7	88	6	865	4	4.0					
AREA AVERAGE	S	63.9	4.00	8	101	7	88	6	881	4	3.7					
***SOUTHEASTERN AREA ***																
BUTTE	S	63.1	3.75	8	100	4	87	3	785	3	2.3					
CHRIS	S	62.9	3.75	9	101	7	88	3	865	3	3.3					
ERA	S	59.9	4.25	9	102	8	89	13	802	2	2.0					
WALDRON	S	62.0	3.75	9	100	7	87	7	860	4	3.0					
AREA AVERAGE	S	61.9	4.50	8	101	6	88	7	827	3	2.3					
***CROP-YEAR AVERAGES ***																
1980 AVERAGE	S	66.5	4.50	9	101	7	88	4	948	3	3.7					
1981 AVERAGE	S	65.0	5.00	9	101	6	87	2	907	3	3.7					
1982 AVERAGE	S	66.5	4.25	7	101	7	88	6	853	4	4.0					
1983 AVERAGE	S	64.3	4.25	8	101	7	88	6	926	4	4.0					
1984 AVERAGE	S	63.5	4.25	8	101	6	88	7	872	4	3.7					
1980-84 AVG	S	65.2	4.50	8	101	7	88	5	901	4	4.0					

QUALITY DATA OF SPRING WHEAT SAMPLES 1984 CROP

TABLE 8 STATE=ARIZONA STATION=PINNACLE CO. NURSERY=FIELD PLOTS

VARIETY	STD #/BU	TEST KWT G.	SIZING			WHT %	WHT %	ASH %	PRO %	SCORE ***	EXT %	65%EX %	PRO %	CHAR %	SCORE **	MILL %	MILL %	MIX %	MIX %
			1000	L6	SM														
GENARO		52.7	36.4	42	3	1.33	10.4	1	6.9	2	0.46	10.1	5	1	59.3	3			
HERMOSILLO	S	63.0	41.3	63	3	1.34	11.3	2	6.3	7	0.37	10.5	5	1	65.0	5			
OSLO	S	63.5	39.2	33	3	1.22	10.3	2	7.3	4	0.35	10.0	5	2	61.7	3			
YECOPA RGJU	S	64.0	45.7	74	1	1.34	11.3	2	7.0	0	0.38	10.2	5	2	61.9	7			
NK 771	S	60.8	41.3	40	2	1.33	10.7	2	6.9	6	0.35	9.5	5	1	60.0	8			
WPA 905		62.6	44.1	79	2	1.11	12.3	2	6.9	0	0.33	11.2	5	1	62.5	4			
WPA 911		60.6	38.9	31	3	1.40	10.4	2	6.5	2	0.45	9.5	4	1	59.3	6			

VARIETY	STD #IN	TEST ABS %	BAKE TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL CC	BAKE SCORE ***	GENERAL SCORE ****	DEFICIENCIES										
										TW	KW	SM	WP	EX	A65	FD	MC	MX	DA	
GENARO	60.0	3.50	5	10.1	4	9.8	7	725	1	1.0	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	
HERMOSILLO	65.7	3.25	7	10.3	5	8.9	7	375	4	2.3	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	
OSLO	S	62.6	3.25	5	10.1	4	9.7	37	7	2.7	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	
YECOPA RGJU	S	62.7	5.50	7	9.9	7	8.5	3	805	3	2.3	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ
NK 771	S	61.1	5.50	6	10.0	7	8.8	11	785	3	2.0	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ
WPA 905		63.5	4.00	9	10.0	7	8.7	7	840	4	2.3	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ
WPA 911		60.2	5.50	5	9.9	7	8.7	4	725	1	1.3	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ

DEFICIENCIES
MINOR FAULTING VALUES 57.9 40.3 57.9 13.9 69.6 47 12.9 61 12.4 5.75-9.09 2.00-2.75
MAJOR FAULTING VALUES 56.7 37.3 18 12.9 67.6 51 12.4 UNDER 1.75 OVER 8.00 4 6 3 4
*** = NO PROMISE ?= LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE

DEFICIENCIES
TW = TIME (MIN) 6 6 6 6
K = 75.75 3 3 3 3
SM = 7.55 7.55 7.55 7.55
WP = 7.55 7.55 7.55 7.55
EX = 7.55 7.55 7.55 7.55
A65 = 7.55 7.55 7.55 7.55
FD = 7.55 7.55 7.55 7.55
MC = 7.55 7.55 7.55 7.55
MX = 7.55 7.55 7.55 7.55
DA = 7.55 7.55 7.55 7.55
MI = 7.55 7.55 7.55 7.55
DC = 7.55 7.55 7.55 7.55
CC = 7.55 7.55 7.55 7.55
CG = 7.55 7.55 7.55 7.55
LV = 7.55 7.55 7.55 7.55

QUALITY DATA OF SPRING WHEAT SAMPLES 1924 Crop

TABLE 9 STATE=CALIFORNIA STATION=IMPERIAL VALLEY NURSERY=FIELD PLOTS

VARIETY	STD WT #/BU	KWT G.	LG %	ASH %	PRO %	SCORE *+*	FXT %	ESYEX %	FLR %	ASH %	FLR %	MILL %	MILL %	MIX %	MIX %	ABS **	PAT %
1923 N.O. STD.	5	61.8	32.6	2	1.94	15.3	4	70.6	0.40	14.1	5	65.0	4	1	61.0	3	
PEAGULITA S.	49.9	47.1	57	1	2.26	12.4	1	61.5	0.58	10.4	4	61.0	4	1	60.3	3	
JUANILLO 163	54.6	49.3	54	1	2.68	12.4	1	65.6	0.61	10.4	4	61.0	4	1	60.3	3	
PROGRAN 711	59.2	34.0	21	6	1.57	12.5	2	69.0	0.42	11.3	5	61.7	6	2	61.7	6	
PROMBRED	60.5	36.4	13	6	1.52	12.7	2	67.8	0.42	11.3	5	62.8	5	1	62.8	5	
WESTBRED 911	60.1	36.5	25	7	1.64	11.9	2	65.6	0.47	10.6	4	65.0	6	1	65.0	6	
YECOYA ROJO	61.4	39.5	29	5	1.64	13.4	3	68.9	0.42	12.0	5	64.2	7	2	64.2	7	
P931-232	59.3	36.5	26	6	1.64	11.9	2	67.3	0.46	10.5	5	64.7	5	1	64.7	5	
D92-2-152	61.3	32.5	11	10	1.62	12.9	2	65.1	0.44	11.6	4	61.5	5	1	61.5	5	
UC 355	61.7	34.0	19	4	1.59	12.4	2	65.4	0.37	11.5	5	63.5	2	1	63.5	2	
775-42-36	59.6	33.8	10	8	1.62	12.3	2	70.2	0.42	11.2	5	64.2	6	2	64.2	6	
310/75	63.9	35.7	30	5	1.61	11.4	2	66.1	0.45	10.1	4	64.2	3	1	64.2	3	
310/9	64.2	34.4	25	3	1.61	13.0	3	68.1	0.38	11.9	5	64.2	2	1	64.2	2	
310/12	64.6	41.0	52	4	1.54	13.3	3	69.9	0.40	11.9	5	64.4	2	2	64.4	2	
310/35	63.0	35.3	45	2	1.58	12.5	2	65.8	0.44	11.2	4	64.7	3	1	64.7	3	
310/76	61.5	34.1	19	6	1.52	11.9	2	69.1	0.33	10.5	5	64.4	2	2	64.4	2	
310/46	61.1	32.6	20	4	1.50	11.1	2	70.9	0.37	9.9	5	61.7	2	2	61.7	2	
310/47	63.2	32.2	17	8	1.64	12.2	2	65.5	0.43	10.3	4	64.7	4	1	64.7	4	
310/48	62.9	31.9	8	5	1.67	12.3	2	70.4	0.35	10.2	5	63.2	3	2	63.2	3	
310/50	63.5	33.7	16	4	1.53	12.3	2	70.0	0.35	11.3	5	63.2	2	2	63.2	2	
310/53	63.1	35.8	32	3	1.60	13.4	3	69.5	0.49	12.1	5	65.3	2	2	65.3	2	
310/62	61.6	35.3	22	4	1.55	12.8	2	70.3	0.49	11.7	5	62.9	7	2	62.9	7	
310/75	62.9	32.9	8	5	1.54	11.7	2	70.1	0.42	10.4	5	63.9	3	2	63.9	3	
310/76	64.5	32.7	12	3	1.51	11.7	2	69.6	0.36	10.4	5	64.7	3	2	64.7	3	

QUALITY DATA OF SPRING WHEAT SAMPLES 1984 CROP

TABLE 9 (Cont.)

STATE=CALIFORNIA STATION=IMPERIAL VALLEY NURSERY=FIELD PLOTS

VARIETY	STD.	STD.	BAKE ABS %	MIX TIME MIN	DOUGH COLOR	CRUMB CHAR	GRAIN VOL CC	BAKE SCORE ***	GENERAL SCORE ****	DEFICIENCIES														
										TW	KW	SM	WP	FX	A65	FP	MC	MAX	MIN	MI	MJ	NJ	WJ	AJ
1983 N.D.	65.5	5.59	9	100	7	89	7	955	4	4.0									MI	MI	MI	MI	MI	MI
BEAGULITA S.	63.3	3.00	6	100	4	88	2	740	1	1.0									MJ	MJ	MJ	MJ	MJ	MJ
JUANILLO 163	62.6	2.75	1	97	2	87	2	625	1	1.0									MJ	MJ	MJ	MJ	MJ	MJ
PROSPAND 711	62.1	4.75	3	101	8	89	11	855	3	2.3									MJ	MJ	MJ	MJ	MJ	MJ
PROURED	64.2	5.00	3	100	3	87	7	775	2	1.7									MJ	MJ	MJ	MJ	MJ	MJ
WESTBRED 911	66.5	5.00	7	101	8	90	13	775	2	1.7									MJ	MJ	MJ	MJ	MJ	MJ
YECGRA ROJD	65.6	6.50	9	101	9	90	12	815	1	2.0									MJ	MJ	MJ	MJ	MJ	MJ
P931-232	65.7	3.25	5	101	3	89	3	715	2	1.7									MJ	MJ	MJ	MJ	MJ	MJ
P932-152	64.3	5.00	9	100	4	87	7	750	2	1.7									MJ	MJ	MJ	MJ	MJ	MJ
UC 355	64.5	2.00	6	100	7	89	12	835	1	1.3									MJ	MJ	MJ	MJ	MJ	MJ
77S-4236	65.2	4.75	6	100	7	90	11	325	2	2.0									MJ	MJ	MJ	MJ	MJ	MJ
310/5	65.3	2.75	6	101	7	89	13	725	1	1.3									MJ	MJ	MJ	MJ	MJ	MJ
310/8	65.3	2.00	5	100	7	88	7	755	1	1.7									MJ	MJ	MJ	MJ	MJ	MJ
310/12	65.2	2.25	5	100	3	89	7	800	1	2.0									MJ	MJ	MJ	MJ	MJ	MJ
310/35	66.0	2.25	5	100	7	90	11	750	1	1.3									MJ	MJ	MJ	MJ	MJ	MJ
310/36	65.5	2.25	5	100	7	88	7	755	1	1.7									MJ	MJ	MJ	MJ	MJ	MJ
310/46	62.7	2.25	2	99	4	88	7	710	1	1.7									MJ	MJ	MJ	MJ	MJ	MJ
310/47	66.1	3.00	5	100	4	88	7	725	2	1.7									MJ	MJ	MJ	MJ	MJ	MJ
310/49	64.3	3.25	5	100	7	87	3	725	1	1.7									MJ	MJ	MJ	MJ	MJ	MJ
310/50	64.3	2.00	5	101	8	88	7	785	1	1.7									MJ	MJ	MJ	MJ	MJ	MJ
310/53	66.4	2.50	5	100	7	88	7	745	1	2.0									MJ	MJ	MJ	MJ	MJ	MJ
310/62	64.1	5.25	9	101	8	89	11	895	3	2.3									MJ	MJ	MJ	MJ	MJ	MJ
310/75	65.3	3.00	5	100	7	87	3	745	1	1.7									MJ	MJ	MJ	MJ	MJ	MJ
310/76	66.0	2.50	5	102	7	87	7	805	1	1.7									MJ	MJ	MJ	MJ	MJ	MJ

DEFICIENCIES
SING FAULTING VALUES 57.9 30.5 EX 66.5 TW 2.7 8.3 01.9 5.75-8.00 2.70-2.75
MAJOR FAULTING VALUES 56.9 27.5 18 12.9 66.5 51 12.4 0.4 UNDFR 1.75 OVER 8.00
*** I=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOD PROMISE

DC CC CG LV

6 6 6 900

4 4 4 350

3 3 3 4

QUALITY DATA OF SPRING WHEAT SAMPLES 1984 CROP

TABLE 10 STATE=ARIZONA STATION=MESA NURSERY=FIELD PLOTS

VARIETY	STD WT #/BU	TEST 1000 G.	SIZING LG %	WHT ASH %	WHT ASH %	FLR EXT %	ASH %	FLR EXT %	PRO %	CHAR %	MILL	MILL	MIX	MIX
											#	**	APT	%
YECORA QCJ0	S	63.5	45.7	7.9	1	1.21	12.5	2	70.7	0.35	11.7	5	2	64.4
906R	S	62.9	48.5	8.3	1	1.31	13.3	3	70.1	0.34	12.1	5	2	64.4
C79-77	S	62.6	40.5	4.9	2	1.26	10.3	1	70.2	0.35	9.9	5	2	61.9
C79-152-1	S	63.5	42.9	7.0	1	1.14	13.1	3	67.8	0.35	11.4	5	1	67.0
C79-221	S	62.9	41.7	4.9	1	1.19	12.0	1	69.7	0.31	10.6	5	2	65.0
C79-263-1	S	62.0	45.0	6.5	1	1.28	12.7	2	65.3	0.32	11.2	4	1	61.7
I-5	S	62.3	43.9	6.3	1	1.03	11.9	2	69.3	0.34	10.5	5	2	65.0
I-26	S	62.7	39.5	5.3	3	1.30	12.3	1	67.3	0.37	10.9	5	1	65.0
I-43	S	62.2	40.1	4.5	2	1.27	11.9	1	68.6	0.32	10.8	5	2	65.3
I-70	S	62.6	42.9	7.3	1	1.23	13.1	3	70.9	0.35	11.3	5	2	68.5
I5-3214	S	62.3	41.5	5.9	2	1.29	12.6	1	71.7	0.33	11.8	5	2	68.8
I5-3322	S	63.0	40.2	5.4	2	1.34	11.9	1	69.2	0.34	10.7	5	2	66.3
L1P-4	S	63.0	41.7	5.8	1	1.14	12.1	1	69.6	0.29	10.7	5	2	66.0
L1P-20	S	62.1	40.3	6.5	1	1.22	11.9	1	68.1	0.35	10.8	5	1	65.7
L1P-21	S	63.8	43.5	7.0	1	1.14	12.0	2	68.4	0.29	10.6	5	2	66.6
L1P-31	S	63.0	46.1	7.7	1	1.21	13.0	3	70.1	0.32	11.6	5	2	67.0

QUALITY DATA OF SPRING WHEAT SAMPLES 1984 CROP

TABLE 10 (Cont.)

STATE=ARIZONA STATION=MESA NURSERY=FIELD PLOTS

DEFICIENCIES	TW	K ^a	S4	4P	EX	A65	F ^b	MC	MIX	MIX TIME (MT)	DC	CC	CG	LV	
SPUR FAULTING VALUES	57.9	45.0	3	13.9	63.3	.47	12.9	3	2.7,8	61.9	5.75-8.00	2.00-2.75	6	6	300
MAJOR FAULTING VALUES	56.9	42.0	1.3	12.9	66.3	.51	12.4	2	1.9-11	60.4	UNDER 1.75	OVER 8.00	4	3	750

*** 1=END PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

QUALITY DATA OF SPRING WHEAT SAMPLES 1984 CROP

TABLE 11 STATE=ND/SD DAKOTA STATION=MINOT NURSERY=FIELD PLOTS

VARIETY	STD #/EU	TEST 1000 SIZING			WHT %	ASH %	PRO %	SCORE ***	EXT %	65%EX %	PRO %	CHAR %	SCORE ***	ABS %	PAT	MIX	MIX
		WT	KWT G.	LG %													
ALEX	S	62.6	28.3	7	1	1.18	14.2	4	68.5	0.36	13.8	5	4	64.4	7		
BUTTE	S	62.4	28.4	7	1	1.11	14.0	4	68.3	0.33	13.0	5	4	64.7	4		
COTEAU	S	60.0	26.7	2	1	1.25	15.6	4	69.3	0.37	13.7	5	4	64.7	3		
LEN	S	61.9	31.3	26	1	1.25	14.5	4	71.5	0.35	12.7	5	3	64.2	6		
MARSHALL	S	61.1	28.0	6	2	1.19	13.2	3	72.8	0.32	12.7	5	3	61.0	4		
WALDRON	S	60.6	25.7	18	1	1.22	13.7	3	68.0	0.33	13.4	5	4	61.9	6		
CLAF	S	61.8	32.6	20	1	1.23	14.3	4	66.9	0.31	13.0	5	3	62.3	7		

VARIETY	STD #/EU	BAKE ABS			DOUGH TIME MIN	CHAR COLOR	CRUMB GRAIN	GRAIN VOL	LOAF VOL	BAKE SCORE ***	GENERAL SCORE ***	DEFICIENCIES					
		BAKE	MIX	TIME								TW	KW	SM	WP	EX	A65
ALEX	S	65.3	5.00	9	101	7	88	6	825	4	4.0						
BUTTE	S	65.2	2.75	8	102	6	88	3	800	2	3.3						
COTEAU	S	66.0	3.00	7	100	7	89	12	855	4	4.0						
LEN	S	65.3	5.25	9	100	4	89	6	885	4	3.7						
MARSHALL	S	62.0	3.25	7	100	7	89	10	795	3	3.0						
WALDRON	S	62.9	4.50	8	100	8	91	12	865	4	3.7						
CLAF	S	63.3	5.00	8	101	8	88	6	895	4	3.7						

VARIETY	STD #/EU	DEFICIENCIES			TW	KWT G.	SM %	WP %	EX %	A65	FP	MC	MX	BA	CC	CG	LV
		DEFICIENCIES	VINOR FAULTING VALUES	MAJOR FAULTING VALUES													
ALEX	S	4.0	27.7	8	13.9	67.2	12.9	2.7	12.9	3	2.7	8.8	84	5.75-8.00	2.00-2.75	6	6
BUTTE	S	3.3	24.7	18	12.9	65.2	12.4	2.4	12.4	2	1.9-11	60.4	61.9	UNDER 1.75	OVER 8.00	4	3
COTEAU	S	4.0	27.7	8	13.9	67.2	12.9	2.7	12.9	3	2.7	8.8	84	5.75-8.00	2.00-2.75	6	6
LEN	S	3.3	24.7	18	12.9	65.2	12.4	2.4	12.4	2	1.9-11	60.4	61.9	UNDER 1.75	OVER 8.00	4	3
MARSHALL	S	3.0	27.7	8	13.9	67.2	12.9	2.7	12.9	3	2.7	8.8	84	5.75-8.00	2.00-2.75	6	6
WALDRON	S	3.0	27.7	8	13.9	67.2	12.9	2.7	12.9	3	2.7	8.8	84	5.75-8.00	2.00-2.75	6	6
CLAF	S	3.7	27.7	8	13.9	67.2	12.9	2.7	12.9	3	2.7	8.8	84	5.75-8.00	2.00-2.75	6	6

1=LITTLE PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

* = GOOD PROMISE. ** = FAIR PROMISE. *** = POOR PROMISE.

QUALITY DATA OF SPRING WHEAT SAMPLES 1984 CROP

TABLE 12

STATE=ENCRTH DAKOTA STATION=LANGDON NURSERY=FIELD PLOTS

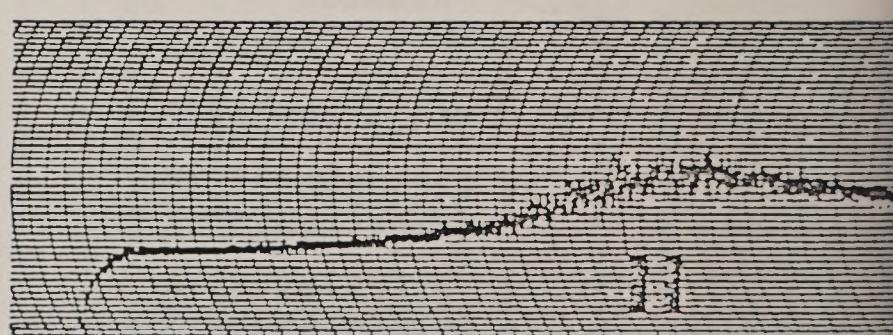
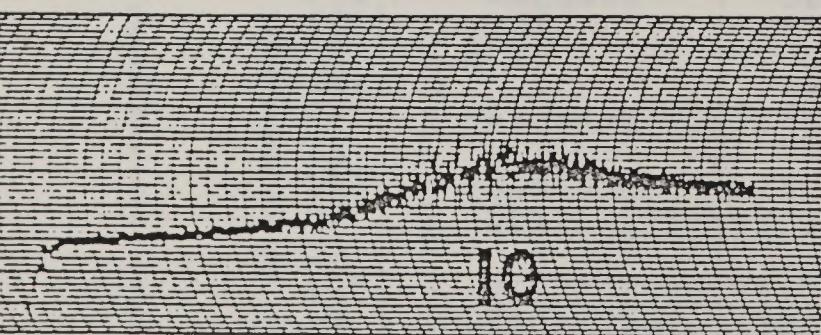
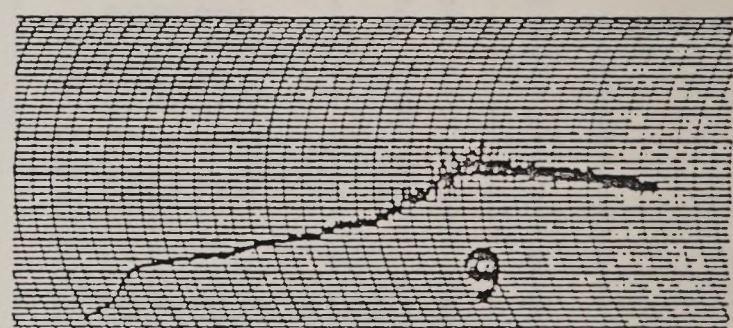
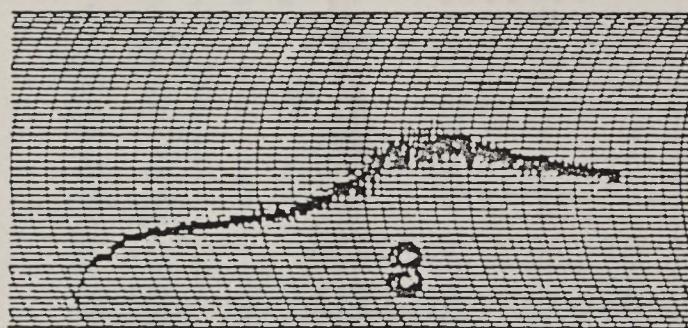
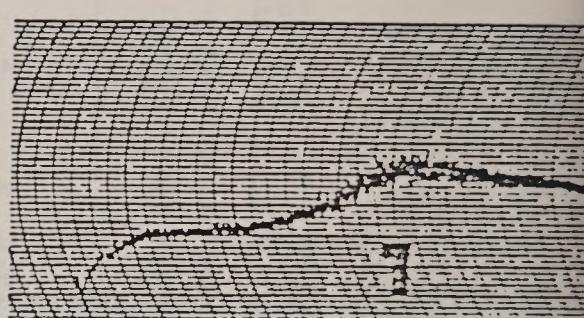
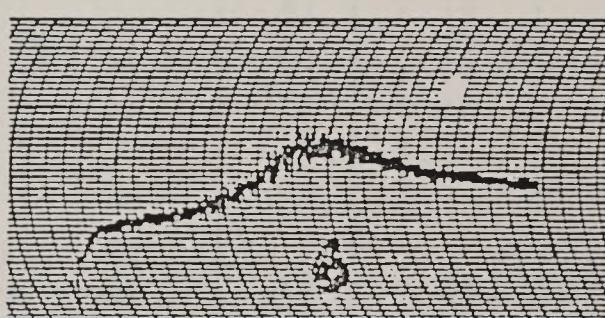
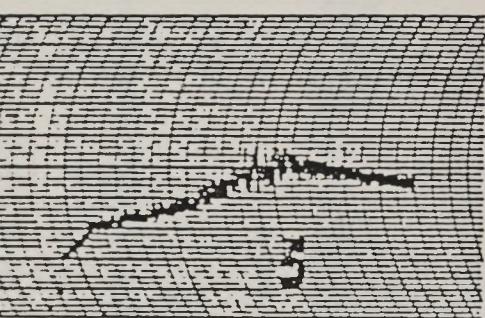
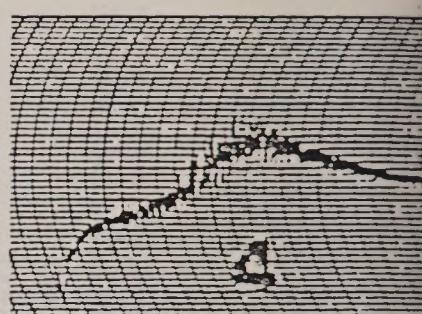
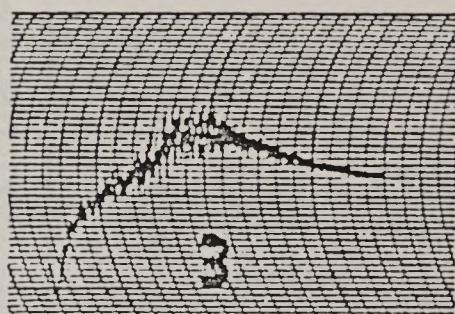
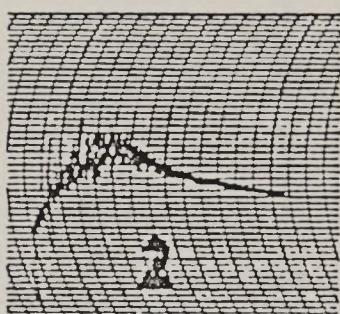
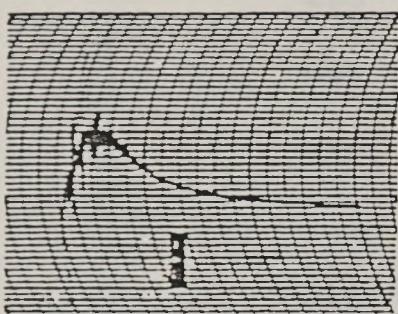
VARIETY	TEST	1000 WT #/BU	KWT G.	SIZING LG %	WHT SM %	ASH %	PRO X	SCORE ***	EXT %	65% EX	PRO X	CHAR	SCORE ***	MILL %	MILL %	MIX ABS %	MIX ABS %	PAT
	STD																	
ALEX	62.6	34.5	57	1	1.63	15.3	4	70.3	0.36	15.0	5	4	67.6	6				
BUTTE	S	62.4	33.0	45	1	1.55	14.8	4	71.3	0.34	14.3	5	4	65.7	4			
COTEAU	S	61.1	33.4	43	1	1.75	16.6	4	69.7	0.43	16.1	5	4	67.6	4			
LEN	S	62.4	38.3	75	1	1.63	15.5	4	71.4	0.37	15.0	5	4	65.7	6			
MARSHALL	S	61.8	32.1	48	2	1.59	13.9	3	73.6	0.35	13.6	5	4	62.3	3			
CLAF	S	62.4	44.6	79	1	1.53	15.3	4	69.9	0.33	15.0	5	4	67.6	6			
WALDRON	S	59.8	34.0	49	1	1.75	15.5	4	71.3	0.41	15.2	5	4	66.6	5			

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LCAF VOL CC	BAKE SCORE ***	GENERAL SCORE ***	DEFICIENCIES-----					
										TW	KW	SM	WP	EX	A65 FP MC MX BA MT DC CC CG LV
EX															
STIE	S	68.4	5.00	8		101	8	89	10	900	4				4.00
TEAU	S	68.6	3.25	8		101	7	90	12	850	4				4.00
N	S	66.6	2.75	6		99	4	87	1	825	1				3.00
RSHALL	S	63.3	4.75	8		99	6	90	12	875	4				4.00
RAF	S	68.7	3.00	7		102	8	90	12	845	4				3.7
LDRON	S	67.1	4.50	9		100	4	88	6	945	4				4.00
										925	4				4.00

DEFICIENCIES	TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MIX TIME (MT)	DC	CC	CG	LV
MINOR FAULTING VALUES	57.9	33.0	8	13.9	69.2	.47	12.9	3	2.7.8	61.9	5.75-8.00	2.00-2.75	6	6	828
MAJOR FAULTING VALUES	56.9	30.0	18	12.9	67.2	.51	12.4	2	1.9-11	60.4	UNDER 1.75	OVER 8.00	4	3	778

REFERENCE MIXOGRAMS

HARD RED SPRING WHEAT



U.S.D.A. SPRING WHEAT QUALITY LABORATORY

FARGO, NORTH DAKOTA

